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Notes on taxonomy, distribution and ecology of some Ecuadorian high páramo Asteraceae, tribe Senecioneae

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Abstract

Notes on taxonomy and distribution of three species, *Lasiocephalus sodiroi* SCHLDTL., *Senecio ferrugineus* (KLATT) CUATREC., and *Pentacalia chimborazensis* SKLENÁŘ sp. nov., from the high páramos of Ecuador are presented. For the latter species, the illegitimate synonym, *Senecio hallii* HIERON., is cited.

Introduction

The family Asteraceae is the most diverse and most important plant group in the páramo vegetation of the tropical Andes (VAN DER HAMMEN & CLEEF 1986, RAMSAY 1992, LUTEYN 1999, SKLENÁŘ 2000). The páramo checklist contains 858 species from 101 genera which accounts for 25 % of the total species diversity of the páramos (LUTEYN 1999), and new species are still being added to this list (e.g. DÍAZ-PIEDRAHÍTA & VÉLEZ-NAUER 1994, SKLENÁŘ & ROBINSON 2000). *Senecioneae* belongs to the tribes which contribute most to the diversity of the family in the Andean highlands (FUNK 1997). In the páramos this tribe is represented by several important genera among which the most diverse are *Senecio, Pentacalia*, and *Lasiocephalus.*

During the years 1995–99 flora and vegetation of the Ecuadorian high Andes were studied with the emphasis on the highest altitudinal zone - the superpáramo (SKLENÁŘ 2000). The study was carried out in eighteen superpáramo areas located in the northern and central parts of the country, and a brief excursion to southern páramos of Ecuador was undertaken in

1999. The research resulted in about 100 species of the family Asteraceae, in involving recollections of some rare and less known species which may be sometimes confused with other species. This contribution aims at clarifying the status of three Ecuadorian superpáramo species and at providing information of their ecology and distribution.

Treatments of the species

Lasiocephalus sodiroi **(Hieron.) Cuatrec.**, Phytologia 69: 313 (1990). Basionym: *Culcitium sodiroi* Hieron., Bot. Jahrb. Syst. 29: 63 (1900). - Syn.: *Senecio sodiroi* (Hieron.) Cuatrec., Field. Bot. 27 (1): 45 (1950). - Orig. coll.: Sodiro s.n., Ecuador: "Crescit in summis pascuis montium Imbabura et Chimborazo" (B destroyed, photo 18150 F!, US!; lectotype P, designated by Cuatrecasas in Phytologia 69: 313 (1990), not seen).

In the recent checklist of Ecuadorian vascular plants the species *Lasiocephalus sodiroi* occurred in the synonymy of a wide-spread Andean species *L. ovatus* Schltdl. (Nordenstam 1999). From the descriptions, photographs of type specimens, and field observations it is evident, however, that *L. sodiroi* is a very distinct species within *Lasiocephalus*, a genus reinstalled by Cuatrecasas (1978), or within the genus *Aetheolaena* sensu Nordenstam (1978).

Lasiocephalus sodiroi can be easily distinguished by its delicate stature and height up to 20 cm, and one-nerved, linear to linear-lanceolate leaves with revolute margins; the needle-like leaves are indeed a unique feature in the Ecuadorian members of the genus. The species *L. ovatus* is much more robust in habit, often it attains a height over 50 cm, and the leaves are three-nerved, ovate.

During the survey in the Ecuadorian páramos, both species, *Lasiocephalus ovatus* and *L. sodiroi*, were repeatedly collected. The former species is a conspicuous superpáramo element and was found in various types of habitats, e.g. closed vegetation of the lower superpáramo, rocky outcrops, sandy soils, and very often it can be found colonizing surfaces of cushion plants. It is known from the páramos of Colombia and Ecuador (Luteyn 1999). In Ecuador it occurs throughout the high páramos ranging from Volcán Chiles at the Colombian border down to the Sangay National Park (Sklenář 2000); it was not found further south in the Cajas region but there is a recent collection of *Lasiocephalus* cf. *ovatus* from that area (w^{3}TROPICOS 2000). The species *L. sodiroi* is much rarer than the previous one and so far only few collections have been made. Including the type material, the species has been recorded from the following Ecuadorian mountains: Volcán Chiles, Cerro Imbabura, Cayambe, Corazon, Chimborazo. The species was mostly collected in rocky habitats in the (super)páramo belt, but there is a remarkable record from lower altitudes of the Andean montane forest in the mountain Corazon (Cerón & Mena 1214).

List of specimens: Carchi: Holm-Nielsen et al. 5893, 19 May 1973, 3900–4050 m (MO!); Sklenář & Kostečková 1404, 6 Oct. 1995, 4100 m (AAU!, US!). **Imbabura**: Cazalet & Pennington 5775, 16 Dec. 1961, 14000 ft. (NY!); Sklenář & Kostečková 505, 5 Jun. 1995, 4300–4350 m (AAU!, QCA). **Pichincha**: Cerón & Mena 1214, 19-20 Apr. 1987, 3200–3500 m (AAU!, MO, US!); Sklenář & Kostečková 786, 3 Jul. 1995, 4300 m (AAU!, NY, PRC!, QCA, QCNE, US!); in 1998 at the US Herbarium, additional collections of the species from the Cayambe volcano were inspected, however, no notes were made about label information at that time.

***Senecio ferrugineus* (Klatt) Cuatrec.**, Field. Bot. 27 (1): 44 (1950). Basionym: *Culcitium ferrugineum* Klatt, Ann. K. K. Naturhist. Hofmus. 9: 363 (1894). - Orig. coll.: Hall s.n., Ecuador: "Chimborazo, juxta limitem nivis perpetuae" (B destroyed, photo 18143 F!).

This "culcitioid" species was transferred to the large and heterogeneous genus *Senecio* by Cuatrecasas (1950), where it was maintained until Nordenstam (1999) put it in the synonymy of *Culcitium rufescens* Bonpl. Descriptions, photographs of type specimens, and field observations give evidence that *Senecio ferrugineus* is a very distinct species among the Ecuadorian "senecios". Unlike *C. rufescens* and *C. canescens* Bonpl. (sensu Nordenstam 1999), which may grow as tall as 50 cm and have a basal rosette of 15–25 cm long, tomentose leaves, and up to four capitula per plant, *Senecio ferrugineus* is a small delicate plant only up to 15 cm tall, with a basal rosette of 10–15 narrowly oblong-lanceolate barbate-lanate leaves, 2–4 cm long with revolute margins, dark reddish stem, and a solitary nodding capitulum.

Senecio ferrugineus is a very rare species and most likely endemic to the Chimborazo volcano. Its occurrence seems to be restricted to a narrow altitudinal belt on the eastern mountain side; in 1997 the species was found growing among rocks on sparsely colonized glacial moraines at altitudes of 4500–4700 m. Although the label information by Hitchcock (21970) indicates altitudes 3600–4500 m (see below), from the observed habitat requirements it can be assumed that the species most probably does not occur below the upper superpáramo belt.

List of specimens: Chimborazo: Hitchcock 21970, 4 Oct. 1923, 3600–4500 m (US!); Sklenář & Sklenářová 2223, 3 Jul. 1997, 4600 m (AAU, PRC!, QCA, QCNE, S!, US!), 2230, 4 Jul. 1997, 4680 m (QCNE), 2278, 4 Jul. 1997, 4600–4700 m (QCA).

Pentacalia chimborazensis Sklenář **sp. nov**. Type: **Ecuador**, **Bolívar/Chimborazo**: Volcán Chimborazo, W. side of the mountain, sparse superpáramo vegetation, sandy slope on the right side of the gully which crosses the road to the refuge in its hair-pin bend ca 4 km from the road Ambato–Guaranda, 1°28'S 78°48'W, 14 Sept. 1995, 4600–4800 m, Sklenář & Kostečková 1275 (PRC! Holotype; QCA, QCNE Isotypes).

Syn.: *Senecio hallii* Hieron., Bot. Jahrb. Syst. 21: 358 (1895), nom. illeg. non *S. hallii* Britton, Trans. New York Acad. Sci. 9: 11 (1889).

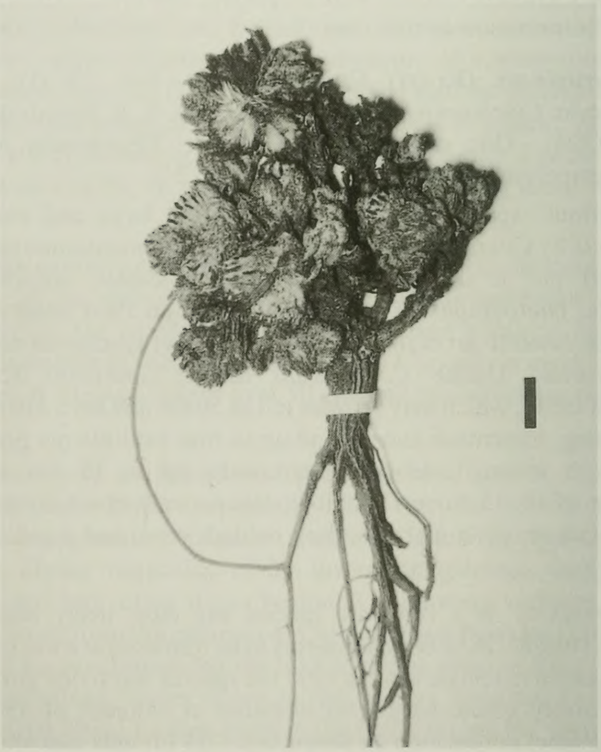

Fig. 1.

Pentacalia chimborazensis Sklenář, bar = 1 cm (from holotype).

Suffrutex 10–20 cm altus, radice ramosa, caule dense folioso, ferrugineo, ramoso, rami ad 5 cm longis. Folia alterna, petiolata; lamina lanceolata, supra purpurea, subtus viridis cum costa purpurea, utrinque pilis longis articulatis dense obsita, margine subserratodentata, revolutaque. Anthodia terminalia, solitaria vel in corymbo, calyculata, bracteis involucralibus numero 9–13, biseriatis, pilis longis articulatisque tectis. Flosculi bisexuali, numero (25) 30–45, corollis claviformibus, flavescentibus vel flavovirentibus, ramis stigmatis linearibus, superne truncatis, antheris apice acutis. Achenia costata, pubescentia, pappo albido.

Perennial suffrutescent herb 10–20 cm tall. Roots ramified, 15–40 cm long. Stem light brown with little red in younger parts, densely covered with leaves, ramified, sometimes numerous branches clustered above the woody base or no branches present at all, the branches up to 5 cm long. Leaves alternate, petiolate; petiole 0.5–1.1 cm long, dark red, glabrous or with few to numerous long articulated hyaline hairs along the margins or in the middle of the abaxial side; lamina lanceolate, 0.7–1.6 cm long and 0.3–0.7 cm wide, upper surface dark red, sometimes pale green in the middle, lower surface green with dark red midrib, sparsely to densely covered on both sides with up to 6–7 (10) mm long articulate hyaline hairs, some hairs with red septa between cells, leaf margins subserrate-dentate, revolute. Capitula solitary or (1) 2–5 in small terminal corymbs, peduncle ca 3 mm long. Capitulum discoid, 8–12 mm wide and 9–11 mm high, with 8–10 narrowly linear bracteoles 6–10 mm long and with acute apex forming calyculus, light green below middle, dark red above middle with black tip and with long articulate hyaline hairs along margins up to upper third. Involucral bracts 9–13, biseriate, 6–10 mm long, pale green becoming dark red in the upper third and with black tips, the green part of the bracts covered with long articulate hyaline hairs; outer bracts lanceolate to narrowly ovate, apex acute; inner bracts ovate to broadly ovate with membranaceous margins, apex acute to obtuse. Florets bisexual, (25)30–45 per capitulum; corolla narrowly clavate, light yellow to greenish-yellow, 5-lobed; corolla lobes 0.6–0.8 mm long and ca 0.5 mm wide at the base, acute, cucullate; throat 3.3–3.6 mm long and 0.9–1.1 mm wide; tube 1.9–2.5 mm long and 0.25–0.45 mm wide; style ca 1.6 mm long, yellow-brown to reddish-brown, style branches ca 0.6–0.8 mm long, linear, apex truncated with numerous papillae; anthers 2–2.1 mm long, light brown, apical appendage acute, base shortly pointed. Pollen grains echinate, ca 22 µm diam. Pappus bristles ca 5.0–5.5 mm long, usually no longer than throat when in flower, white, slightly curved. Achenes 1.5–3.2 mm long and 0.5–0.65 mm wide, ribbed, sparsely to densely pubescent, light green when young, becoming brown when mature.

The species *Pentacalia chimborazensis* was first collected by Francis Hall on the eastern side of Chimborazo volcano (Hall s.n., Ecuador: "Chimborazo, infra limitem nivis perpetuae" (B destroyed, photo 15607 F!, US!)) probably during Boussingault's expedition to Chimborazo in 1831. Two collections of this species were later made by Alphons Stübel in 1872. His first collection was again from the eastern side of Chimborazo (Stübel 307, Ecuador: "crescit in monte Chimborazo infra limitem nivis perpetuae", 4900 m, (B destroyed), but an additional locality was found in the Eastern Cordillera of Ecuador in the páramos located NW of the Sangay volcano (Stübel 259, Ecuador: "crescit prope Calcitpungo in Páramo del Alao haud procul ab urbe Riobamba", 4200 m, (B destroyed), where a very abundant population of the species was observed (Stübel 1897, p. 247). Though the latter locality was not found on the recent maps (?perhaps Cerro Caluispungu, 4110 m, on the IGM map sheet Llactapamba de Alao), both localities were most likely within today's limit of the Chimborazo Province. The material mentioned above was studied by Hieronymus (1895) who described the species as *Senecio hallii* Hieron., which was, however, an illegitimate later homonym of *S. hallii* Britton (Trans. New York Acad. Sci. 9: 11, 1889). The type material at B was destroyed and it is unlikely that any duplicates exist; thus only a photograph of Hall's collection is available. To provide a firm basis for typification of this species, it is here newly described and the illegitimate homonym replaced.

Nordenstam (1999) correctly pointed to the sub-shrubby habit of the species by stating "dubious species; not a *Senecio*, possibly a *Monticalia*". The suffrutescence is similar to some other high páramo "senecioid" species of Ecuador, e.g. *Pentacalia microdon* (Wedd.) Cuatrec., which along with the floral structure justify the transfer to the genus *Pentacalia* subg. *Microchaete*, sometimes distinguished as a separate genus, *Monticalia*.

Since Stübel, few collections of the species were made and those were mainly from the western side of the Chimborazo volcano; on this mountain side the species was also observed by me in 1995 and 1999. The plants were found on sandy soils in rocky habitats of the upper superpáramo, and only solitary growing individuals were seen. Although some of the páramos in the Alao region were surveyed in 1997 (but not the Stübel locality) the species was not found there (Sklenář 2000). A small and distinct population of the species was found in 1999 on the SW side of the Carihuairazo volcano (province Tungurahua, ca 10 km to NW of Chimborazo), inhabiting analogous environment as observed on Chimborazo. This population differs by the almost complete lack of red pigmentation which results in a yellowish-green appearance of the plants; all examined plants from Chimborazo have remarkably red-green leaves. Due to the limited number of localities and scattered occurrence, the species *P. chimborazensis,* apparently endemic to central Ecuador, is very rare.

Further collections: Bolívar/Chimborazo: Sklenář & Kostečková 1320, 14 Sept. 1995, 4400–4600 m (AAU!); Sklenář & Kostečková 1394, 14 Sept. 1995, 4700 m (QCA). **Chimborazo**: Rauh & Hirsch E 319, 20 Sept. 1951, 4900 m (NY!), Lægaard 102811, 11 May 1992, 4980 m (AAU!); 102815, 11 May 1992, 5040 m (AAU!); 102830, 11 May 1992, 5090 m (AAU!); Sklenář 7507, 5 Jul. 1999, 4800 m (QCA); 7531, 5 Jul.1999, 4600–4800 m (PRC!, QCNE). **Tungurahua**: Sklenář & Lægaard 7252, 12 Jun. 1999, 4600 m (AAU, PRC!, QCA, QCNE, S!).

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Problems in *Pertya* Sch. Bip.

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Abstract

Recent work on the genus *Pertya* has revealed a problem in the application of names to the type, *P. scandens* (Thunb.) Sch. Bip., and a second species thought to have been published at the same time. The problem is discussed. *Pertya ovata* Maxim. is the name that should apply to the plant commonly known as *P. scandens*; the plant usually referred to as *P. glabrescens* is actually *P. scandens*.

Introduction

Recent work for the tribe *Mutisieae* in the forthcoming Compositae volume of Kubitzki's *The Families and Genera of Vascular Plants*, has unearthed an interesting problem with the genus *Pertya* Sch. Bip. *Pertya* is a small genus of fifteen species. The genus is distributed from Afghanistan east to China and Japan, with the greatest concentration of species in China.

A considerable literature (e.g. Koyama 1975, Nagata 1991, Nakai 1927, Numata & Asano 1969, Ohwi 1965, Satake et al. 1985) has cited Schultz Bipontinus as the author of three names: *Pertya, P. scandens* (Thunb.) Sch. Bip. and '*Pertya glabrescens* Sch. Bip.' *Pertya scandens* sensu auct. pl. refers to plants with fascicles of leaves beneath the capitula.

The genus *Pertya* was validly published by Schultz Bipontinus (1862) based on a single species, and named after his friend Dr Joseph Anton Maximilian Perty ('Professor in Bern of Zoology and general Natural History'). *Pertya scandens* (Thunb.) Sch. Bip. was based on *Erigeron scandens* Thunb. (Thunberg 1784) and was first described with two unnamed varieties; it was published with a good diagnostic plate which was clearly assigned to *Pertya scandens*.

The problem I wish to highlight follows the short diagnosis 'Folia elliptico-lanceolata, glabrescentia, 1-2½ pollicaria.'. under 'Var. II' where Schultz Bipontinus cited: 'Syn. Leucomeris scandens SzBip. In litt. ad b. a Klenze (1845) et in Zollinger! Syst. Verz. der im ind. Archipel 1842-1848 ges. so wie aus Japan empf. Pflanzen p. 126 (an. 1854). = Pertya glabrescens SzBip. MS. si specie a planta Thunbergiana differat.' (Schultz Bipontinus 1862). [The Zollinger reference (1854-55) is simply to a list of published determinations by Schultz Bipontinus and refers to '*Leucomeris scandens* Sch. Bip.'].

Schulz Bipontinus (1862), although not explicitly naming the varieties certainly did not accept the second as the species '*Pertya glabrescens*' (he clearly refers to 'species generis unica'); the name '*Pertya glabrescens* Sch. Bip.' is therefore invalid (Greuter et al. 2000: Art.34.1). Since the two 'varieties' are now generally regarded as two distinct species a name is required for each. When researching this it became evident that there is a problem with the application of names to the taxa concerned.

Schultz Bipontinus clearly applied the name *P. scandens* to a taxon with apparent fascicles of leaves beneath the solitary capitula; this is well illustrated in 'tab. 10' of the protologue and directly referred to the species (Schulz Bipontinus 1862). It is also clear from the protologue of *Pertya* that this was considered a generic characteristic; indeed nothing was mentioned of solitary alternate leaves. The distinction provided by Schultz Bipontinus between the two taxa was simply on leaf shape (ovate vs. elliptic-lanceolate) and the presence or absence of an indumentum.

Successive authors have clearly applied the name '*P. scandens*' to plants with capitula on 'elongated branches' (e.g. Koyama 1995, Nakai 1927, etc.). '*Pertya glabrescens*' is applied to plants with capitula on 'abbreviated branches' with fascicles of three to five subtending leaves (e.g. Koyama 1995, Nakai 1927, Numata & Asano 1969, Nagata 1991, Satake et al. 1985, etc.). This approach is incorrect and is at odds with the protologue of *P. scandens*.

Taxonomy

The resolution to the problem is as follows:

Pertya Sch. Bip., Bonplandia 10: 109. 1862. - Type: *Pertya scandens* (Thunb.) Sch. Bip.

Pertya scandens (Thunb.) Sch. Bip., Bonplandia 10: 109. 1862. Basionym: *Erigeron scandens* Thunb., Fl. Japonica: 313. 1784. (type: 'crescit in insula

Nipon.' - type not cited). *Leucomeris scandens* Sch. Bip. in Zollinger, Syst. Verzeich. Ind. Arch. Japan Pflanz.: 126. 1854–55, nom. nud. *Leucomeris scandens* (Thunb.) Sch. Bip., Flora 37: 275. 1854. *Pertya glabrescens* Sch. Bip., Bonplandia 10: 109. 1862, nom. nud. *Pertya glabrescens* sensu auct. pl. [pro 'var. II' and including tab. 10]. *Pertya scandens* Sch. Bip. forma *schultziana* Franchet, Mem. L'Herb. Boiss. 14: 1. 1900. (syntypes: 'Hab. Ile de Sikoku, sur les montagnes de Tosa ([Faurie] n. 11829. Ile de Nippon, aux environs de Sendai ([Faurie] n. 6756; au pied du Fudsi Yama ([Faurie] n. 6657.' - types in P). *Pertya scandens* Sch. Bip. var. *viridis* Nakai, Trees and shrubs indig. Japan proper. 1: 710. 1922. (type: apparently not cited).

The combination *Leucomeris scandens* (Thunb.) Sch. Bip. was effectively made in the same year (Schultz Bipontinus 1854).

Distribution. China and Japan (Koyama et al. 1970, Koyama 1975)

Pertya ovata Maxim., Bull. Acad. Imp. Sci. St Pétersbourg 16: 217. 1871. (syntypes: 'Hab. in Nippon peninsula Idzu in fruticetis sat frequens, a Simoda (Kusnezoff) per montium jugum Hakone dictum usque ad Yokohamam et planitiem Yedoensem.' - types in LE; in K there is a Maximowicz collection 'Iter secundum. Japonia. Yokohama. 1862' which may represent type material). *Pertya scandens* sensu auct. pl. [pro 'var. I' and usually excluding tab. 10]. *Pertya scandens* Sch. Bip. forma *maximowicziana* Franchet, Mém. L'Herb. Boiss. 14: 2. 1900. (syntypes: 'Hab. Ile de Sikoku, dans les montagnes de Tosa ([Faurie] n. 11834). Ile de Nippon, collines à Yokohama ([Faurie] n. 6736.' - types in P).

Distribution. An endemic to Japan.

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The comparative method and trait evolution in the Asteraceae

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Abstract

In this paper the use of phylogenetic comparative methods in the evolution of morphological traits in *Salmea* and *Tithonia* (Asteraceae: Heliantheae) is presented. Some considerations about the relevance of this approach to understand trait evolution and diversification are discussed.

Introduction

In the last 15 years many statistical methods have been developed for the analyses of comparative data in evolutionary biology (Harvey & Pagel 1991, Martins & Hansen 1996). Comparative analyses of traits across taxa that explicitly take into account the phylogenetic relationships among the taxa involved are commonplace in modern evolutionary biology. The rationale for these methods is the recognition that species usually do not constitute independent points in statistical analyses because they share characteristics from common ancestors at distinct distances in evolutionary time. Hence, in comparative studies, species cannot be treated as if they represent independent and identically distributed data points, and ordinary statistical methods cannot be used.

Felsenstein (1985) proposed the "independent contrasts" method (IC), that was originally devised as a way of addressing the problem of statistical dependence of comparative data within a population genetics framework. If the phylogenetic relationships among species and the amount of expected change along each branch of the phylogeny are known, then, a simple algorithm can be used to transform the measured species data into a set of N−1 standardized and independent contrasts, where N is the number of species measured (Martins & Hansen 1996). This method assumes that the evolution of the measured trait can be described using a Brownian motion model of phenotypic evolution. This method has been widely used in plant ecology (see Table 1).

The phylogenetic autocorrelation method (CHEVERUD et al. 1985) proposes the use of networks spatial autocorrelational techniques, to incorporate phylogenetic information into comparative analyses. The method assumes that the total variation (T) in a quantitative character can be partitioned into phylogenetic (P) and specific (S) components, described by the linear model $\mathbf{Y} = \rho\ \mathbf{W}\ \mathbf{Y} + \varepsilon$. **Y** is a vector describing trait variation in a set of species with length equal to n (number of species analysed), and **W** is a matrix $n * n$ that describes the phylogenetic similarity between all pairs of n species, but with zeros in the main diagonal. In this model, the term $\rho\ \mathbf{W}\ \mathbf{Y}$ represents the phylogenetic component (P) and ε the specific component (S). Finally, the magnitude of the phylogenetic correlation, or inertia, in data is given by: $\mathbf{R}^2 = 1$ – Variance of (S)/ Variance of (T).

Estimating evolutionary correlations, phylogenetic inertia, ancestral states and phylogenetic effects are some of the most common analyses to evaluate evolutionary trends in ecological and morphological traits (JORDANO 1995, EZCURRA et al. 1997, ACKERLY & DONOGHUE 1998, MORALES 2000).

The studied system, the Asteraceae, is one of the richest and most diverse plant families in the world (BREMER 1994) and its evolutionary patterns have been described as phylogenetic trees (BREMER1994, JANSEN et al. 1992). However, evolutionary trends in morphological and/or reproductive characters have not been analysed following a comparative approach as described above for most of the genera and species (but see EZCURRA et al. 1997, MORALES 2000). SWENSON & BREMER (1997) and FUNK (1982) have applied phylogenetic analyses using parsimony to test hypotheses of evolutionary trends in the Asteraceae. At the present, the interest in detecting patterns to describe evolutionary processes has been widely accepted and documented in plant ecology studies.

The aim of this paper is to emphasize the relevance of the comparative methods, in particular independent contrasts and phylogenetic correlation, in understanding trends of diversification among two genera of the tribe Heliantheae, viz. *Salmea* and *Tithonia*.

Methods

The species

Salmea DC. is a small, Neotropical genus of shrubs (scandent or viny in one species), subshrubs, and suffrutescent perennials. The genus includes ten species divided in three sections, and is found from México and Central America to Argentina and Brazil. Bolick (1981) has described their phylogenetic relationships.

The genus *Tithonia* consists of eleven species of coarse annual or perennial herbs or shrubs, found from the Southwestern United States to Costa Rica (La Duke 1982, Bremer 1994). The available phylogeny for the genus has been proposed by La Duke (1982), based on morphological characters.

For the purpose of this study, both phylogenies are assumed to be a true description of the evolutionary relationships within each genus.

Data analysis

Leaf length and width, corolla size and seed size, were obtained from the literature for both species (Bolick 1991, La Duke 1982). Additionally number of florets per head and seeds per head were documented only for *Tithonia*, and florets per capitulum only for *Salmea*.

First, I conducted a conventional phenotypic correlation analysis in order to describe ecological correlation, then, I applied the method of phylogenetic independent contrasts (Felsenstein 1985) to test this hypothesis and to estimate correlation among traits. To detect possible life-history trade-off a comparison between correlation coefficients obtained from both methods is presented in order to discuss whether the independent contrast method makes a substantial difference as compared to the use of species mean values.

Second, the autocorrelational analysis (Cheverud et al. 1985) was used to estimate phylogenetic effects and inertia. The method assumes that within species phenotypic variation does not exist, that the phylogenetic relationships are known, that the total trait values are composed of phylogenetic and nonphylogenetic components and that the residuals of the linear model can be used in further analyses (Martins 1996). Both comparative analyses were conducted with the program COMPARE 4.2 (Martins 1999).

Results

Conventional correlation analyses for species mean values

Correlation between morphological traits

Salmea. Only two significant correlations were found. Leaf length and leaf width are positively and significantly correlated ($r= 0.732$, $p<0.01$, d.f.= 8), and seed size is correlated with leaf length ($r= 0.694$, $p<0.05$, d.f.= 8) (Table 2A).

Tithonia. Seed size is negatively correlated to the number of florets per head ($r= -0.703$; $p<0.01$; d.f.=10) and the number of seeds per head ($r= -0.589$; $p<0.025$; d.f.=10). The number of seeds per head and the number of florets per head had a positive correlation ($r= 0.756$; $p<0.005$; d.f.=10) (Table 2B).

Phylogenetic Independent Contrasts

Salmea. Leaf length was positively and significantly correlated with leaf width ($r= 0.755$, $p<0.05$, d.f.= 8) and seed size ($r= 0.636$, $p<0.05$, d.f.= 8) (Table 2A).

Tithonia. Again seed size was negatively correlated with the number of florets per head ($r= -0.750$; $p<0.005$; d.f.=9) and the number of seeds per head ($r= -0.684$; $p<0.025$; d.f.=9). The number of seeds per head is positively correlated with the number of florets per head ($r= 0.856$ $p<0.005$; d.f.=9) (Table 2B). These patterns are the same as those observed from the conventional correlation analysis for specific mean values.

Phylogenetic autocorrelation

Salmea. The only trait with a significant value for the autocorrelation coefficient (ρ) was seed size (see Table 3). The proportion of variance accounted for phylogeny is very low in all five traits and varies between 7% and 9%. Florets per capitulum showed a marginally statistical significance for the estimated ρ ($r=0.56$, d.f. 8, $p=0.06$).

Tithonia. The autocorrelation coefficient (ρ) was significantly greater than zero for four traits: seed size, florets per head, seeds per head and leaf length (Table 3). The proportion of the variance explained by phylogeny ($\mathbf{R}^2$) was between 30% –80%.

Discussion

The results presented here show some trends in the evolution and diversification in two genera of the Asteraceae and some evident design restriction and possible trade-off in relation with seed size. The former is demonstrated with the negative relationship between seed size and seed number, because increases in seed size may come at the expense of producing fewer seeds per fruit. It demonstrates the need to address the historic component by using both phylogenetic comparative methods and taxonomic treatments.

The results of this study show that, first, evolutionary correlations that involve seed size have been detected. Second, several traits exhibit significant levels of phylogenetic effects, and third, following a comparative approach seems to be relevant and needed to understand trait evolution and diversification in Asteraceae.

Few studies using comparative methods have been conducted in Asteraceae. EZCURRA et al. (1997) analysed leaf morphology evolution of *Chuquiraga* sect. *Acanthophyllae* (Asteraceae-Barnadesioideae) in relation to climate. Using independent contrasts they evaluated if leaf width reduction can be considered an adaptation to arid environments. Their results demonstrate that leaf reduction has appeared independently two times in this group and it is related with increasing temperatures of habitats. Their main conclusion is that leaf morphology evolution is related with recent climatic effects.

I have also applied comparative analyses in my own research focused on the analysis of evolution of life history traits in *Tithonia* (MORALES 2000). I could demonstrate the relevance of and the need to understand the historic component in plant demography and morphology, by combining experimental evidence for demographic effects and statistically developed phylogenetic comparative methods.

The comparative method is a relatively new approach in studies of plant evolution and as any novel method it can be "a victim" of its use and abuse in order to test a wide range of topics in evolutionary biology. I found relevant that in some cases conventional statistical analyses could be just as informative as comparative analyses, as noted in this paper.

MAZER (1998) has made some criticisms to the use of the independent contrast method. She emphasizes that there are no statistical differences between conventional and comparative methods, the main difference is how patterns could be used to infer the action of the processes.

In order to maintain and increase the interest in applying phylogenetic comparative methods in understanding trait evolution and diversification in Asteraceae, I wish to make a final statement. I consider that an integrative approach to recognize processes (i.e. phylogenetic inertia, actual selection, and environmental variation) and understanding their significance could give us some key aspects to understand the mechanisms of trait evolution.

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Table 1. Studies in plant ecology that employ different comparative methods (Modified from Morales in press)

Phylogenetic independent contrasts methods	Phylogenetic autocorrelation
Armstrong & Westoby (1993)	Jordano (1995)
Kelly & Purvis (1993)	Morales (2000)
Kelly (1995)	
Kelly & Beerling (1995)	
Kelly & Woodward (1995)	
Beerling & Kelly (1996)	
Crawley et al. (1996)	
Franco & Silvertown (1996)	
Kelly & Woodward (1996)	
Rees (1996)	
Silvertown & Dodd (1996)	
Ezcurra et al. (1997)	
Ackerly & Donoghue (1998)	

Table 2A. Pairwise correlations for morphological traits in the genus *Salmea* †

	Leaf length	Leaf width	Florets per capitulum	Corolla length	Seed size
Leaf length	—	**0.732 *** *0.755 **	**- 0.345** *- 0.012*	**0.418** *0.017*	**0.694** *0.636*
Leaf width		—	**- 0.509** *- 0.282*	**- 0.059** *- 0.303*	**0.390** *0.316*
Florets per capitulum			—	**0.013** *0.508*	**0.075** *0.137*
Corolla length				—	**- 0.087** *- 0.278*

† Values in bold face correspond to correlations between traits without transformation (raw data), whereas values in italics are the correlations for the phylogenetic independent contrast method. * = $p<0.05$.

Table 2B. Pairwise correlations for morphological traits in the genus *Tithonia* †

	Leaf length	Leaf width	Florets per head	Seeds per head	Corolla length	Seed size
Leaf width	**0.255**	—				
Florets per head	**- 0.120** *- 0.327*	**0.017** *- 0.082*	—			
Seeds per head	**- 0.377** *- 0.269*	**0.157** *0.214*	**0.756** *0.856**	—		
Corolla length	**0.253** *0.259*	**0.031** *0.020*	**0.517** *0.258*	**0.547** *0.325*	—	
Seed size	**0.392** *0.389*	**0.032** *0.135*	**- 0.703*** - 0.750*	**- 0.589** *- 0.684**	**0.336** *0.109*	—

† Values in bold face correspond to correlations between traits without transformation (raw data), whereas values in italics are the correlations for the phylogenetic independent contrast method. * = $p<0.05$.

Table 3. Phylogenetic autocorrelation coefficients (ρ) and phylogenetic correlation (R^2) for morphological traits in the genera *Salmea* and *Tithonia* †

Genus	Trait	Phylogenetic	Autocorrelation
		ρ	R^2
Salmea	Leaf length	0.23	0.097
	Leaf width	-0.15	0.099
	Florets per capitulum	0.53	0.085
	Corolla length	-0.1	0.099
	Seed size	0.84*	0.076
Tithonia	Leaf length	0.46*	0.30
	Leaf width	0.39	0.37
	Florets per head	0.71*	0.58
	Seed per head	0.83*	0.67
	Corolla length	0.39	0.37
	Seed size	0.75*	0.62

† from MORALES (2000). *$p<0.05$

Una especie nueva de Asteraceae para Peru y Bolivia: *Gochnatia lanceolata*

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Resumen

Se describe e ilustra *Gochnatia lanceolata* (Asteraceae-Mutisieae), una especie nueva de las vertientes occidentales del Perú y Bolivia. Se discuten sus posibles relaciones de la especie y se presenta una clave para las especies peruanas.

Abstract

Gochnatia lanceolata (Asteraceae, Mutisieae), a new species from western Andean Cordillera of Peru and Bolivia, is described and illustrated. The relationships of the species are discussed and a key is presented for Peruvian species.

Introducción

El género *Gochnatia* consiste de ca. 68 especies (Pruski 1997), generalmente concentradas en sudamerica y el caribe (Cabrera 1971), en el Perú existen 4, todas endémicas (Ferreyra 1995). Revisando el material existente en los herbarios USM y US, encontramos un arbusto particular que presenta capítulos desarrollados y hojas conspicuamente lanceolados que proponemos como especie nueva.

Gochnatia lanceolata H. Beltran & Ferreyra, sp. nov.

Tipo: **Peru**. Dpto. Arequipa. Provincia Castilla. Localidad Andagua. Arbusto de 1.80 m, caducifolia, hojas coriáceas, flores blanco-amarillentos. Suelo arenoso, volcánico, no pedregoso, 3700 m, Carolina 01 (Holotipo, USM; Isotipo, US).

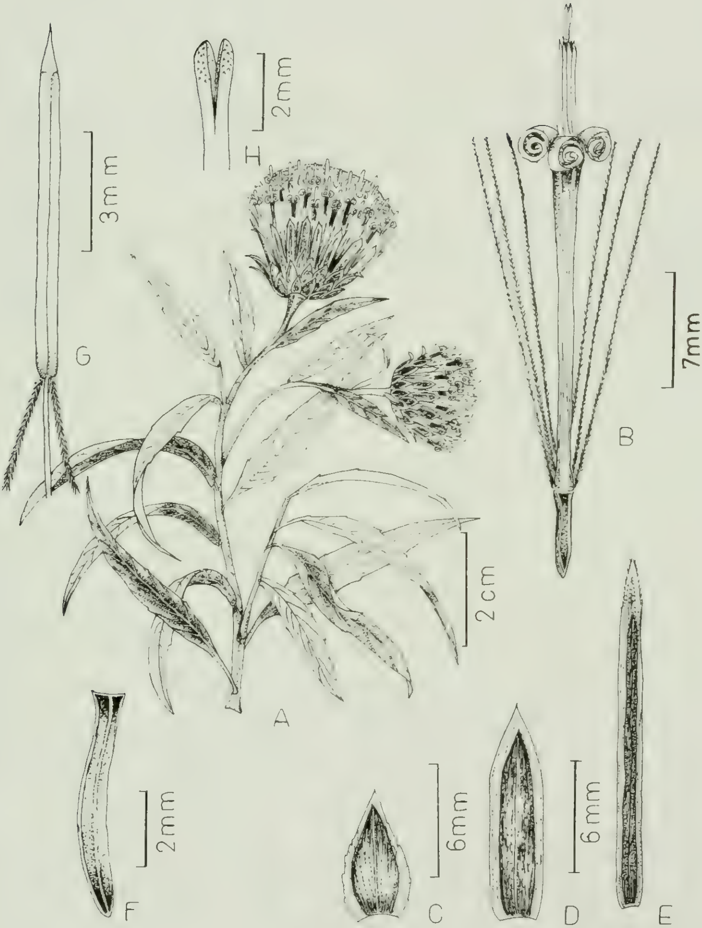

Fig.1.

Gochnatia lanceolata BELTRAN & FERREYRA.
A. Hábito; B. Flor; C. Filaria externa;
D. Filaria medial; E. Filaria interna; F. Aquenio; G. Antera;
H. Ramas estigmáticas (Dibuja par H. BELTRAN de CAROLINA 01, USM).

Frutex ca. 2 m altus, ramosus, ramis teretibus. Folia alterna, lanceolata, 4–6 cm longa, 0.6–1.3 cm lata, coriacea, apice acuta recurvata, basi attenuata, margine breviter dentata, utrinque glabra. Capitula pauca, discoidea, 2.5 cm alta, 3.4 cm diametro. Involucrum campanulatum, 1.5–2 cm altum, 2–2.5 cm diametro; bracteis 5–6-seriatis, imbricatis. Flores ca. 50, isomorphi, hermaphroditi; corolla tubulosa, 14–16 mm longa, profunde pentasecta, segmentis linearibus recurvatis. Antherae lineares ca 11.5 mm longae, appendicibus apicalibus longe apiculatis, appendicibus basalibus laciniatis. Achaenia turbinata, 7–8 mm longa; pappus 3-seriatus, 14–16 mm longus.

Arbusto de 2 m de alto; tallo terete, acanalado. Hojas simples, alternas, frecuentemente agrupadas apicalmente, sésiles a subsésiles; lámina rígido-coriácea, lanceolada a oblonga-lanceolada, 4–6 cm de longitud y 0.6–1.3 cm de ancho, ápice agudo ligeramente recurvado, base atenuada, margen denticulado rígido, venación pinnada, ambas superficies glabras. Capitulescencia formado por capítulos solitarios en el extremo de las ramas, cortamente pedunculado. Capítulo discoideo, pocos 2.5 cm de alto, 3.5 cm de diámetro; involucro anchamente cilíndrico a campanulado, 1.5–2.5 cm de alto, 2–2.5 cm de diámetro; filarias 5–6 seriado, imbricado, las brácteas externas coriáceas, resinoso, ovado, 7 mm de longitud por 3 mm de ancho, las del medio coriáceas, elíptico–lanceolado, 11 mm de longitud por 3 mm de ancho, las internas papiráceo, lineal-lanceolado, 19 mm de longitud por 1.2 mm de ancho, ventral y apicalmente algo piloso; flores ca 50, isomorfas, corola actinomorfa verde-amarillento, tubo de la corola 14–16 mm de longitud, profundamente lobado, casi hasta la mitad del tubo, enrollados; anteras lineales, 11.5 mm de longitud, apéndice apical lanceolado-acuminado, la base caudada, laciniada; ramas estigmáticas cortamente bilobado, 2 mm de longitud, dorsalmente papiloso. Aquenio (inmaduro) cilíndrico turbinado, 7–8 mm de longitud, glabro, costado; papus amarillento, 14–16 mm de longitud, formado por tres series de cerdas escábridas.

Material adicional estudiado: **Bolivia**. Potosí: Prov. J. M. Linares, Jatun Palmar. Arbusto 1.2 m. Capítulos sin flores liguladas, hojas pegajosas, gruesas, ásperas. 2750 m. G. Torrico & C. Peca 336 (US 3258424, LPB no visto).

Discusión

En concordancia a la información proporcionada por Cabrera (1971) y Bremer (1994) la especie nueva descrita se ubica en el género *Gochnatia* por la presencia en las anteras de apéndices conectivales apiculados y colas laciniadas.

Entre las especies del género, *Gochnatia lanceolata* esta más relacionado a *G. rotundifolia* del sudoeste de Brasil por poseer ambas superficies de las hojas completamente glabras y capítulos grandes con más de 50 flores.

Es interesante que *G. lanceolata* no sea tan parecido a las especies simpátricas peruanas y bolivianas, al compararlos con los caracteres morfológicos; indumento de las hojas, tamaño del capítulo, número de flores por capítulo e indumento del aquenio etc.

Esta especie ha sido colectada en las vertientes occidentales del Perú (Arequipa) y Bolivia (Potosí), entre una altitud de 2700–3200 m.

Clave para las especies peruanas de *Gochnatia*

1. Hojas lanceoladas, glabras en ambas superficies. Capítulo de 2–2.5 cm de alto por 2.5–3.5 cm de diámetro .... *G. lanceolata*

– Hojas oblongas a obovadas, tomentosas en el envez. Capítulo de 0.8–14 cm de alto por 0.5–1 cm de diámetro 2

2. Involucro cilíndrico. Flores de 9–12 por capítulo .... *G. arequipensis*

– Involucro campanulado. Flores de 30–40 por capítulo 3

3. Margen de las hoja, dentada .... *G. vargasii*

– Margen de las hoja, no dentadas 4

4. Hojas de 25–60 mm de longitud; involucro de 8–12 mm de alto .... *G. vernonioides*

– Hojas de 10–25 mm de longitud; involucro de 10–14 mm de alto .... *G. patazina*

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Abstract

A catalogue of the Asteraceae type material of CARLOS LUIS SPEGAZZINI (1858–1926) deposited in the Herbarium of Museo de La Plata (LP), Argentina, is presented. SPEGAZZINI and collaborators collected extensively in Argentina, mainly in Patagonia. As a result of these expeditions, SPEGAZZINI`s collection of types reaches ca. 700 specimens from which 77 belong to Asteraceae with 68 of them deposited in LP herbarium. The treatment includes a list of the original or new names arranged alphabetically, the current names with authors, the exsiccata followed by the type category, the original citation or protologue, and all observations considered interesting or relevant. In addition, a list of specimens that were not found in LP, and a list of the numbers of SPEGAZZINI`s herbarium (LPS) arranged from the lowest to the highest values with their corresponding name of taxa are given.

Key words: C. L. SPEGAZZINI, types, Asteraceae, Herbarium LP, Argentina.

Introduction

The herbarium of the Departamento Científico de Plantas Vasculares (LP; HOLMGREN et al. 1990), Museo de La Plata, Argentina, was founded in 1887. It contains approximately 500,000 specimens especially strong in South American Asteraceae. A relevant number of these specimens is constituted by the collection of CARLOS LUIS SPEGAZZINI (1858–1926).

In 1878 this Italian botanist came to Argentina, where he became a leading figure, mainly recognized for his mycological and vascular plants studies. As a result of the collecting expeditions made by SPEGAZZINI himself and by his collaborators, especially in Patagonia, the number of vascular plants in SPEGAZZINI's herbarium reached ca. 100,000 specimens. SPEGAZZINI mantained the majority of them as a personal herbarium (LPS; HOLMGREN et al. 1990). Around 1966 this collection with ca. 700 type specimens, was transferred from LPS to LP. Other specimens remain mainly in BAF, BAB, and CORD (KATINAS et al. 2000). From the type collection, 77 specimens belong to the family Asteraceae with 68 of them deposited in the LP herbarium.

Due to the relevance of these specimens for those botanists working on South American Asteraceae, we believe that it is of interest to provide a detailed information concerning the Asteraceae type specimens of SPEGAZZINI deposited in LP.

This treatment includes a list of the original or new names arranged alphabetically, the current names with authors, the exsiccata followed by the type category and observations, and the original citation or protologue.

New name. The new names of the taxa appear in boldface type with the citation of the author's name, which in most cases is SPEGAZZINI, followed by the place of publication. Occasionally, SPEGAZZINI's original spelling of the name of a genus, species or infraspecific taxon is preceded by the correction of the typographic or orthographic error, e.g., *Brachyclados* (as "*Brachycladus*"). The list of new names of species and infraspecific taxa follows the CD-Rom version of the Index Kewensis (HOOKER & JACKSON 1893–1895, and supplements), the Gray Card Index Database (http://www.herbaria.harvard.edu/Data/Gray/gray.html), and all available literature of SPEGAZZINI where new taxa are described. Taxa cited in the Index Kewensis or the Gray Card Index as originally described by SPEGAZZINI but that we found actually to be new combinations made by SPEGAZZINI were not included in the catalogue.

Current name. Current names of taxa appear in italics. They have been confirmed following mainly ZULOAGA & MORRONE (1999).

Exsicc. Label transcription of each type specimen is given in quotation marks, including: province, area or locality, month, season and/or year, name of collector, number of collector, number of LPS, and number of LP. The country and political province of collection, and the collector was added when the label lacks those data. In the cases that there are more than one sheet (e.g., duplicates, syntypes) they are cited separately with different letters, i.e., (a), (b), (c). The exsiccata is followed by the indication of the nomenclatural type (holotype, lectotype, etc.). When the type designation is annotated in the sheet by some author (e.g., A. L. CABRERA, B. SIMPSON), and/or this designation does not coincide exactly with the protologue it is also indicated. In some cases, data concerning the collector, and place and date of collection were extracted from KATINAS et al. (2000) to help to determinate if it is a type specimen. It is also indicated when the sheet has attached a description or a diagnosis made in SPEGAZZINI's hand (Fig. 1) or when the label is a transcription made by another botanist such as ANGEL L. CABRERA (Fig. 2).

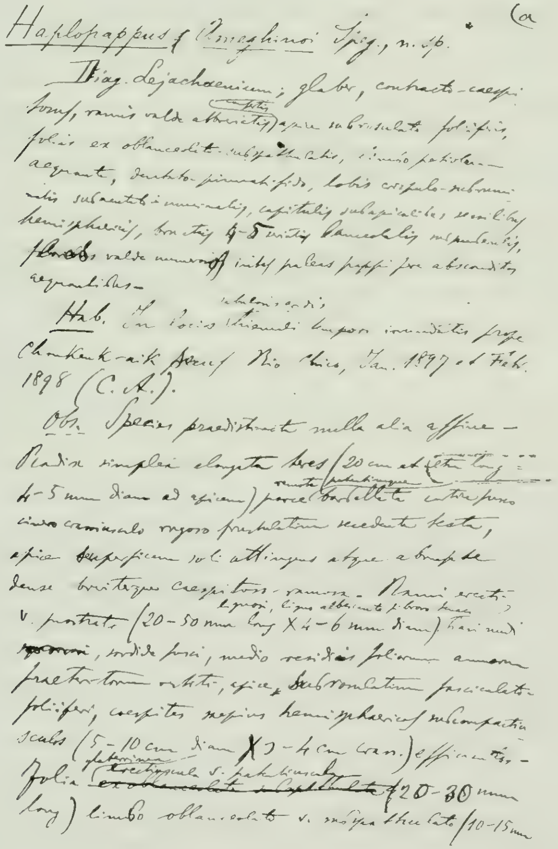
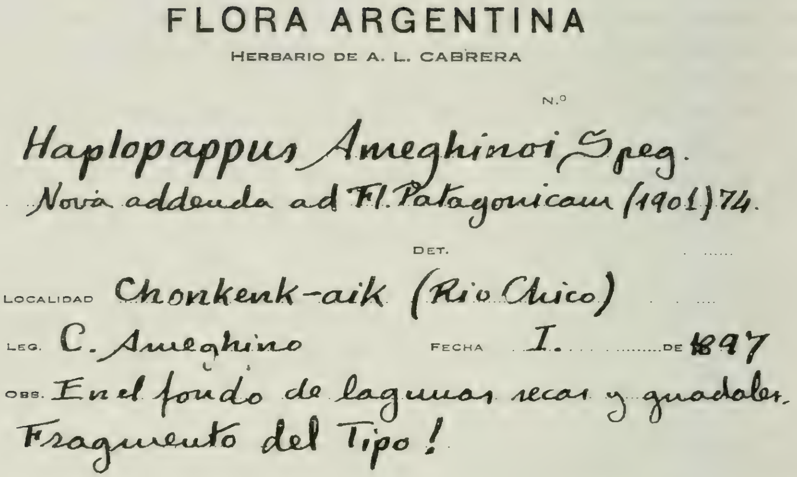


Fig. 1. Fragment of the description of *Haplopappus ameghinioi* SPEG. made in CARLOS L. SPEGAZZINI's hand.



FLORA ARGENTINA
HERBARIO DE A. L. CABRERA

N.º

Haplopappus Ameghinoi Speg.
Nova addenda ad Fl. Patagonicam (1901) 74.

DET.

LOCALIDAD Chonkenk-aik (Rio Chico)
LEG. C. Ameghino FECHA I. DE 1897
OBS. En el fondo de lagunas secas y guadales.
Fragmento del Tipo!

Fig. 2. Transcription of a label made in ANGEL L. CABRERA's hand. CABRERA (1908–1999) was a botanist working in Asteraceae who made enormous contributions to the study of this family of plants.

Protologue. The citation of the locality included in the original description is given.

Obs. All observations considered interesting or relevant are given.

A list of specimens that were not found in LP, and a list of the numbers of LPS arranged from the lowest to the highest values with their corresponding names of taxa were added.

Notes and abbreviations

aest. = aestivus (Latin), summer.
aug. = augustus (Latin), August.
aut. = autumnus (Latin), fall.
C. A. = Carlos Ameghino, a collector.
C. Ameg. = same as above.
cf. = confer (Latin), compare with.
coll. = collegit (Latin), gathered by.
C. S. = Carlos Spegazzini.
dec. = december (Latin), December.
exsicc. = exsiccatum (Latin, singular) dried specimen; exsiccata (Latin, plural), a set of dried specimens.
febr. = februarius (Latin), February.
hab. = habitat (Latin), it inhabits.
in litt. = in litteris (Latin), in correspondence.
in sched. = in schedula (Latin), on a herbarium sheet or label.
isl. = island.
jan. = januarius (Latin), January.
leg. = legit (Latin), collector.
mart. = martius (Latin), March.
mrt. = same as above.
n. = número (Spanish), number.
N. I. = Nicolás Illín, a collector.
nom. illeg. = nomen illegitimum (Latin), illegitimate name.
nov. = november (Latin), November.
n. sp. = nova species (Latin), new species.
n. v. = nova varietas (Latin), new variety.
obs. = observations.
prov. = provincia (Spanish), province, the political divisions of Argentina.
R. = río (Spanish), river.
rec. = recogido (Spanish), gathered by.
S. = San (Spanish, masculine, singular), Santa (Spanish, feminine, singular), Saint.
S.O. = sudoeste (Spanish), southwest.
s/n, s.n. = sine numero (Latin), without number.
T. F. = Tonini del Furia, a collector.
vere = (Latin), of the spring.

List of type material

Achyrophorus leucanthus Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 545. 1897.

Current name: *Hypochaeris incana* (Hook. et Arn.) Macloskie var. *leucantha* (Speg.) Cabrera.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "*Achyrophorus albiflorus*, San Jorge, Patagonia, II-1896, C. Ameghino s/n" (LP 68062). Holotype. The sheet contains the inscription "n. sp." made in Spegazzini's hand.

(b) Argentina, Prov. Santa Cruz, "San Jorge, Patagonia, II-1896, C. Ameghino s/n" (LP 68063). Isotype. Label transcription made by A. L. Cabrera.

(c) Argentina, Prov. Santa Cruz, "Patagonia, Emel-kaik (Río Chico), Aest 12/1897, C. Ameg." Probably non original material.

Protologue: "Hab. In sabulosis maritimis prope Golfo de San Jorge, anno 1896 (C. A.)".

Obs.: There is a full description made in Spegazzini's hand.

Ameghinoa Speg.

Current name: same as above.

Ameghinoa patagonica Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 539. 1897.

Current name: same as above.

Exsicc.: Argentina, Prov. Santa Cruz, "Deseado, 94 [1894], C. Ameghino". Holotype. The sheet contains the inscription "n. sp." and a full description made in Spegazzini's hand.

Protologue: "Hab. Rarissime in valleculis glareosis secus Río Deseado, anno 1894 (C.A.)".

Baccharis chubutensis Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 611. 1897.

Current name: *Baccharis sagittalis* (Less.) DC.

Exsicc.: (a) Argentina, Prov. Chubut, "Chubut, 1889, C. MOYANO 39" (LPS 11508). Syntype. The sheet contains the inscription "n. sp." and a brief diagnosis made in SPEGAZZINI's hand.

(b) Argentina, Prov. Chubut, "Chubut, 1889, C. MOYANO 40" (LPS 16775). Syntype.

(c) Argentina, Prov. Chubut, "Chubut, 1889, C. MOYANO" (LP 61638). Syntype.

Protologue: "Hab. Non communis in pratis uliginosis montanis secus Carrenleofú". Specimens collected in Prov. Chubut in 1889 by C. MOYANO.

Baccharis melanopotamica SPEG., Anales Soc. Ci. Argent. 48: 189.1899.

Current name: same as above.

Exsicc.: (a) Argentina, Prov. Buenos Aires, "La Pantanosa-Río Negro, Carmen de Patagones, Febr. 1898, C.S." (LPS 11467). Syntype.

(b) Argentina, Prov. Buenos Aires, "La Pantanosa-Río Negro, Carmen de Patagones, Febr. 1898, C.S." Syntype.

(c) Argentina, Prov. Buenos Aires, "Salina del Inglés, Carmen de Patagones, Febr. 1898, C.S." (LPS 11465). Syntype.

(d) Argentina, Prov. Buenos Aires, "Alrededores del Carmen de Patagones, Febr. 1898, C.S." (LPS 11468). Syntype.

Protologue: "Hab. Vulgata in aridissimis altiplanitiei secus Río Negro, Jan. et Febr. 1898 (C.S.)".

Baccharis trimera (LESS.) DC. var. ***viscosissima*** SPEG., Anales Soc. Ci. Argent. 48: 188.1899.

Current name: *Baccharis triangularis* HAUMAN.

Exsicc.: (a) Argentina, Prov. Buenos Aires, "Oficina-Pozo, Carmen de Patagones, Febr. 1898, C.S." (LPS 11490). Holotype. The sheet contains the inscription "n. v." made in SPEGAZZINI's hand.

(b) Argentina, Prov. Buenos Aires, "Oficina-Pozo, Carmen de Patagones, Febr. 1898, C.S." (LP 62564). Isotype. Label transcription made by A. L. CABRERA.

Protologue: "Hab. Ad marginem salinarum et in campis salsis secus Río Negro, Febr. 1898 (C.S.)".

Brachyclados (as "*Brachycladus*") ***megalanthus*** SPEG., Anales Soc. Ci. Argent. 53: 29. 1902.

Current name: same as above.

Exsicc.: (a) Argentina, Prov. Buenos Aires, "Tres Cerros-Río Negro, Carmen de Patagones, Febr. 1898, C. S." (LPS 11053). Syntype. The sheet contains the inscription "n. sp." made in SPEGAZZINI's hand.

(b) Sheet without data. Syntype.

(c) Argentina, Prov. Buenos Aires, "Alrededores del Carmen de Patagones, Febr. 1898, C.S." (LPS 11052). Syntype.

(d) Sheet without data. Syntype.

(e) Sheet without data. Syntype.

Protologue: "Hab. Non rarus in praeruptis secus Río Negro, locis gypsosis, Jan. et Febr. 1898 (C.S.)".

Brachyclados (as "*Brachycladus*") ***stuckertii*** SPEG., Com. Mus. Nac. B. Aires 1: 133.1899.

Current name: *Trichocline plicata* D. DON ex HOOK. et ARN.

Exsicc.: Argentina, Prov. Córdoba, "Sierra de Córdoba (Casa Grande, Sierra Chica), misit 22/12 98, Cl.T. STUCKERT". Holotype. The sheet contains the inscription "n. sp." made in SPEGAZZINI's hand.

Protologue: "Hab. In declivibus Cerro blanco et Ascochinga montium Sierra Chica de Córdoba, Febr. 1889 (leg. T. STUCKERT)".

Chiliotrichum diffusum (G. FORST.) KUNTZE var. ***angustifolium*** (as "*angustifolia*") SPEG., Anales Soc. Ci. Argent. 48: 186. 1899.

Current name: *Chiliotrichum rosmarinifolium* LESS.

Exsicc.: Argentina, Prov. Neuquén, "Nahuel Huapi" (LPS 17189). Probable original material.

Protologue: "Hab. In rupestribus montanis prope Nahuel Huapi, Dec. 1897, C. S.".

Culcitium sessile SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 533. 1897.

Current name: *Senecio culcitenellus* CUATREC.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "Hab. S. Jorge (C. AMEGHINO 2/96)" (LPS 12690). Holotype. The sheet contains the inscription "n. sp." and a full description made in SPEGAZZINI's hand.

(b) Argentina, Prov. Santa Cruz, "San Jorge, Patagonia, II-1896, C. AMEGHINO" (LP 75360). Isotype. Label transcription made by A. L. CABRERA.

(c) Argentina, Prov. Santa Cruz, "Altas mesetas al S.O. del cerro Kman-aik (Río Chico), Patagonia, 2/1898, C. AMEGHINO" (LPS 13073). Probable non original material.

Protologue: "Hab. In altiplanitie sicca glareosa prope Golfo de San Jorge, Febr. 1896 (C.A.)".

Doniophyton argenteum SPEG., Anales Soc. Ci. Argent. 15: 107.1883.

Current name: *Chuquiraga morenonis* (KUNTZE) C. EZCURRA.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "S. Cruz, II-1882". Lectotype. (EZCURRA 1985). Annotated "Typus" in SPEGAZZINI's hand.

(b) Sheet without data. Isolectotype.

(c) Argentina, Prov. Santa Cruz, "Sta. Cruz, II/1882". Isolectotype.

(d) Sheet without data. Isolectotype.

Protologue: "Hab. Vulgatissima in alti-planitie nec non in valleculis glareoso-subsabulosis, aridis, prope el Río S. Cruz, el Río Gallegos, atque el Río Deseado, Patagonia australi. Jan. et Aug. 1882".

Erigeron erianthus SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 530. 1897.

Current name: *Erigeron leptopetalus* PHIL.

Exsicc.: Argentina, Prov. Santa Cruz, "Hab. S. Cruz" (LPS 1894). Holotype (SOLBRIG 1962). The sheet contains the inscription "n. sp." made in SPEGAZZINI's hand.

Protologue: "Hab. In pratis montanis prope Lago Argentino, anno 1884 (T. F.)".

Erigeron gayanus J. RÉMY var. ***leptophyllus*** (as "*leptophylla*") SPEG., Anales Soc. Ci. Argent. 48: 241.1899.

Current name: *Erigeron myosotis* PERS.

Exsicc.: (a) Argentina, Prov. Chubut, "Hab. In campis inter Choique-lauen et lago Muster, Dec. 1898" (LPS 17218). Holotype.

(b) Argentina, Prov. Chubut, "Hab. in campis Inter Choique-lauen et lago Muster, Dec. 1898" (LP 60574). Isotype. Label transcription made by A. L. CABRERA.

(c) Argentina, Prov. Chubut, "Chubut, Costas del Río, 1899" (LPS 17217). Probable non orginal material. Annotated by A. L. CABRERA "no es material tipo" (in sched.).

Protologue: "Hab. in pratis editioribus inter Choiqueláuen et Lago Musters, Chubut, Dec. 1898. (N.I.)".

Erigeron philippii SCH. BIP. ex WEDD. f. ***elatior*** SPEG., Anales Soc. Ci. Argent. 48: 241. 1899.

Current name: The species *Erigeron philippii* was referred to *E. myosotis* PERS. by SOLBRIG (1962).

Exsicc.: Argentina, Prov. Santa Cruz, "Karr-aik (Lago Argentino) Patagonia, Aest. 3/98 [1898], C. AMEG." (LPS 17215). Probable orginal material. The sheet contains a brief diagnosis made in SPEGAZZINI's hand.

Protologue: The locality is only cited for the species *Erigeron philippii:* "Hab. In rupestribus aridis loco Karr-aik vocato prope Lago Argentino, Mart. 1898 (C. A.)".

Erigeron platensis (as "*platense*") SPEG., Contr. Fl. Sierra Vent.: 33.1896.

Current name: *Conyza serrana* CABRERA.

Exsicc.: Argentina, Prov. Buenos Aires, "Hab. in pratis Sierrae Ventanae, nov. 95 [1895]". Holotype. The sheet contains the inscription "n. sp." made in SPEGAZZINI's hand.

Protologue: "Abundante en los prados de todo el valle y en las faldas de los cerros". Specimens collected in Prov. Buenos Aires, Sierra de la Ventana, Valle de las Vertientes in 1895 by C. SPEGAZZINI.

Eupatorium commersonii (CASS.) HIERON. var. ***pinnata*** SPEG., Contr. Fl. Tandil: 24. 1901.

Current name: *Eupatorium commersonii* (CASS.) HIERON.

Exsicc.: Argentina, Prov. Buenos Aires, "B. Aires" (LPS 13685). Probable original material.

Protologue: The locality is only cited for the species *Eupatorium commersonii*: "Abundante en todas partes, tanto en los lugares secos como húmedos de las sierras". Specimens collected in Prov. Buenos Aires, Sierras de Tandil by C. SPEGAZZINI in 1898.

Gnaphalium affine D´URV. var. ***medium*** SPEG., Anales Mus. Nac. Hist. Nat. Buenos Aires 5: 63.1896.

Current name: *Gamochaeta spiciformis* (SCH. BIP.) CABRERA.

Exsicc.: (a) Argentina, Prov. Tierra del Fuego, Antártida e Islas del Atlántico Sur, "Uhsuuaia","Sarmiento Bay" (2 labels). Probable original material.

(b) Argentina, Prov. Tierra del Fuego, Antártida e Islas del Atlántico Sur, "Uhsuuaia". Probable original material.

Protologue: The locality is only cited for the species *Gnaphalium affine*: "Sat frequens fere ubique in scopulosis maritimis: Port Cook; Port Vancouver; Port S. John; Elizabeth Isl.; Melville Isl.; Brecknok Pass; Burnt Isl.; Onniuáia; Iandagáia; Uhsuuáia; Aicína; Uállamâtu; Banner Cove; Amakouáia".

Gnaphalium affine d´Urv. var. ***parvulum*** Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires 5: 63. 1896.

Current name: *Antennaria chilensis* J. Rémy var. *magellanica* (Sch. Bip.) Reiche.

Exsicc.: Chile, XII Región, "P. Arena", "Gregory Bay" (2 labels). Holotype. Specimen labeled "b" by Spegazzini.

Protologue: The locality is only cited for the species *Gnaphalium affine*: "Sat frequens fere ubique in scopulosis maritimis: Port Cook; Port Vancouver; Port S. John; Elizabeth Isl.; Melville Isl.; Brecknok Pass; Burnt Isl.; Onniuáia; Iandagáia; Uhsuuáia; Aicína; Uállamâtu; Banner Cove; Amakouáia". The letter "b" written in the specimen by Spegazzini would correspond to the variety "b" in the original description, i.e., var. *parvulum*.

Gnaphalium affine d´Urv. var. ***pusillum*** Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires 5: 63.1896.

Current name: *Gamochaeta nivalis* Cabrera.

Exsicc.: Argentina, Prov. Tierra del Fuego, Antártida e Islas del Atlántico Sur, "Uhsuuaia", "Iandagaia" (2 labels). Holotype. Specimen labeled "a" by Spegazzini.

Protologue: The locality is only cited for the species *Gnaphalium affine*: "Sat frequens fere ubique in scopulosis maritimis: Port Cook; Port Vancouver; Port S. John; Elizabeth Isl.; Melville Isl.; Brecknok Pass; Burnt Isl.; Onniuáia; Iandagáia; Uhsuuáia; Aicína; Uállamâtu; Banner Cove; Amakouáia". The letter "a" written in the specimen by Spegazzini would correspond to the variety "a" in the original description, i.e., var. *pusillum*.

Grindelia speciosa Gillies ex Hook. et Arn. var. ***integrifolia*** Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 528. 1897.

Exsicc.: Argentina, Prov. Santa Cruz, "Santa Cruz, Golfo de San Jorge, II-1896, C. Ameghino" (LPS 20). Holotype.

Current name: *Grindelia chiloensis* (Cornel.) Cabrera.

Protologue: "Hab. In dunis maritimis in Golfo de San Jorge, Febr. 1896 (C. A.)".

Gutierrezia ameghinoi Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 527. 1897.

Current name: *Gutierrezia spathulata* (Phil.) Kurtz.

Exsicc.: Argentina, Prov. Santa Cruz, "Deseado, C. Ameghino 94 [1894]" (LPS 11435). Holotype. The sheet contains the inscription "n. sp."made in Spegazzini's hand.

Protologue: "Hab. Rarissime in pratis glareosis secus Río Deseado, anno 1894 (C. A.)".

Gutierrezia paniculata (DC.) Phil. var. ***patagonica*** Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 608. 1897.

Current name: *Gutierrezia spathulata* (Phil.) Kurtz.

Exsicc.: (a) Argentina, Prov. Chubut, "Chubut, 1889, C. Moyano" (LPS 11432). Holotype. The sheet contains the inscription "n. sp." and a brief diagnosis made in Spegazzini's hand.

(b) Argentina, Prov. Chubut, "Chubut, 1897" (LP 60368). Probably non original mateiral. Annotated "fragmento del tipo!" by A. L. Cabrera (in sched.). Label transcription made by A. L. Cabrera.

Protologue: "Hab. In collinis sterilibus prope Teka-choique". Specimens collected in Prov. Chubut in 1889 by C. Moyano.

Haplopappus ameghinoi Speg., Anales Soc. Ci. Argent. 47:180.1899.

Current name: same as above.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "En fondo de lagunas secas y guadales, Chonkenk-aik (Río Chico), Patagonia, 1/1897, C. Ameghino" (LPS 131). Lectotype (Cabrera 1971). The sheet contains the inscription "n. sp." made in Spegazzini's hand.

(b) Argentina, Prov. Santa Cruz, "En fondo de lagunas secas y guadales, Chonkenk-aik, Río Chico, Patagonia, 1/1897, C. Ameghino" (LP 60193). Fragment of isolectotype. Label transcription made by A. L. Cabrera.

(c) Argentina, Prov. Santa Cruz, "Chonkenk-aik (Río Chico), Patagonia, 2/1898, C. Ameghino" (LPS 79). Paralectotype. The sheet contains the inscription "n. sp." made in Spegazzini's hand.

Protologue: "Hab. In campis depressis aridis limoso-sabulosis, hiemali tempore inundatis, prope Chonkenk-aik secus Río Chico, Jan. 1897 et Febr. 1898 (C.A.)".

Obs.: There is a full description made in Spegazzini's hand. Cf. Fig. 1.

Haplopappus illinii (as "*illini*") Speg., Anales Soc. Ci. Argent. 47:181.1899.

Current name: *Grindelia prunelloides* (Less.) A. Bartoli et Tortosa.

Exsicc.: (a) Argentina, Prov. Chubut, "Chubut, 1899, alturas, N. Illin", "Hab. Choique-lauen et Lago Musters" (LPS 100) (2 labels). Holotype. The sheet contains the inscription "n. sp." made in Spegazzini's hand.

(b) Argentina, Prov. Chubut, "Chubut, 1899, alturas, N. Illin", "Hab. Choique-lauen et Lago Musters" (2 labels) (LP 60208). Isotype. Label transcription made by A. L. Cabrera.

(c) Sheet without data. Probable original material.

Protologue: "Hab. In rupestribus siccis inter Choique-lauen et Lago Musters, Jan. 1899 (N. Illin)".

Haplopappus moyanoi Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 609. 1897.

Current name: *Grindelia anethifolia* (Phil.) Bartoli et Tortosa.

Exsicc.: Argentina, Prov. Chubut, "Chubut, 1889, C. Moyano" (LPS 92). Holotype. The sheet contains the inscription "n. sp." and a brief diagnosis made in Spegazzini's hand.

Protologue: "Hab. In herbosis rupestribus prope Lago Fontana". Specimens collected in Prov. Chubut in 1889 by C. Moyano.

Haplopappus mustersii Speg., Anales Soc. Ci. Argent. 47: 183. 1899.

Current name: *Grindelia prunelloides* (Less.) A. Bartoli et Tortosa.

Exsicc.: (a) Argentina, Prov. Chubut, "Hab. Inter Choique-lauen et Lago Muster, Jan. 1899, N. Illin", "Chubut 1899, Costas de los manantiales, N. Illin" (LPS 675) (2 labels). Holotype. The sheet contains the inscription "n. sp." made in Spegazzini's hand.

(b) Argentina, Prov. Chubut, "Costas de los manantiales inter Choique-lauen et Lago Musters, I-1899, N. ILLIN" (LP 60209). Label transcription made by A. L. CABRERA. Isotype. Annotated "Tipo!" by A. L. CABRERA (in sched.).

Protologue: "Hab. Ad marginem fontium manantiales vocatarum in altiplanitie inter Choique- lauen et Lago Musters, Dec. 1898 (N. ILLIN)".

Haplopappus patagonicus SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 528. 1897.

Current name: *Grindelia brachystephana* GRISEB.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "Hab. S. Cruz" (LPS 33). Syntype. Annotated "C. S., 1882" by A. L. CABRERA (in sched.). The sheet contains the inscription "n. sp." made in SPEGAZZINI's hand.

(b) Argentina, Prov. Santa Cruz, "C. AMEGHINO, 94 [1894], Deseado" (LPS 34). Syntype. The sheet contains the inscription "n. sp." made in SPEGAZZINI's hand.

Protologue: "Hab. Non rarus in dumosis aridis prope Santa Cruz, anno 1882 (C. S.) et prope Río Deseado, anno 1894 (C. A.)".

Obs.: There is a full description made in SPEGAZZINI's hand.

Haplopappus struthionum SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 529. 1897.

Current name: *Haplopappus diplopappus* J. RÉMY var. *struthionum* (SPEG.) CABRERA.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "Deseado, C. AMEGHINO, 94 [1894]" (LPS 98). Lectotype (CABRERA 1971). The sheet contains the inscription "n. sp." made in SPEGAZZINI's hand.

(b) Argentina, Prov. Santa Cruz, "Deseado, C. AMEGHINO, 94 [1894]" (LP 60191). Fragment of isolectotype. Label transcription made by A. L. CABRERA.

(c) Argentina, Prov. Santa Cruz, "Santa Cruz, 82 [1882]" (LPS 97). Paralectotype.

Protologue: "Hab. In campis aridis glareosis secus Río Santa Cruz, anno 1882 (C. S.) et secus Río Deseado, anno 1894 (C. A.)".

Obs.: There is a full description made in SPEGAZZINI's hand.

[***Haplopappus tehuelches*** SPEG., Anales Soc. Ci. Argent. 48: 184. 1899, nom. illeg.]

Current name: *Grindelia brachystephana* GRISEB.

Protologue: "Hab. Non rarus in dumosis aridis prope Santa Cruz, Febr. 1882 (C. S.) et prope Rio Deseado, Mart. 1894 (C. A.)".

Obs.: Based on *H. patagonicus* SPEG. (BARTOLI & TORTOSA 1999).

Hieracium antarcticum (as "*antarctica*") d´Urv. f. ***fuegiensis*** SPEG., Bol. Acad. Ci. (Córdoba) 27: 336. 1924.

Current name: *Hieracium antarcticum* D´URV. var. *antarcticum*.

Exsicc.: Argentina, Prov. Tierra del Fuego, Antártida e Islas del Atlántico Sur, "Harberton (Shamanes), Tierra del Fuego, 17-Enero-1924" C. SPEGAZZINI (LPS 1897). Holotype. The sheet contains a brief diagnosis made in SPEGAZZINI's hand.

Protologue: "Hab. Entre las piedras, sobre el borde de la barranca, en Puerto Harberton".

Hieracium chubutense SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 617. 1897.

Current name: *Hieracium glaucifolium* POEPP. ex FROEL.

Exsicc.: (a) Argentina, Prov. Chubut, "Chubut, 1889, C. MOYANO" (LPS 10141). Holotype. The sheet contains the inscription "n. sp." and a brief diagnosis made in SPEGAZZINI's hand.

(b) Argentina, Prov. Chubut, "Chubut, 1889, C. MOYANO" (LP 68914). Isotype. Label transcription made by A. L. CABRERA.

Protologue: "Hab. In rupestribus herbosis Teka-choique". Specimens collected in Prov. Chubut in 1889 by C. MOYANO.

Hypochaeris variegata (Lam.) Baker var. ***acutibracteata*** Speg., Contr. Fl. Sierra Vent.: 39. 1896.

Current name: *Hypochaeris rosengurttii* Cabrera var. *pinnatifida* (Speg.) Cabrera.

Exsicc.: Argentina, Prov. Buenos Aires, "Hab. In pratis Sierrae Ventanae, Nov. 95." C. Spegazzini. Holotype (Bortiri 1995, in sched.). The sheet contains a brief diagnosis made in Spegazzini's hand.

Protologue: The locality is only cited for the species *Hypochaeris variegata*: "Común en todas las praderas tanto bajas como altas". Specimens collected in Prov. Buenos Aires, Sierra de la Ventana, Valle de las Vertientes in 1895 by C. Spegazzini.

Hypochaeris variegata (Lam.) Baker var. ***glaucescens*** Speg., Contr. Fl. Sierra Vent.: 39. 1896.

Current name: *Hypochaeris variegata* (Lam.) Baker.

Exsicc.: "Hab. In pratis Sierrae Ventanae, Nov. 95". Holotype (Cabrera 1939). The sheet contains a brief diagnosis made in Spegazzini's hand.

Protologue: The locality is only cited for the species *Hypochaeris variegata*: "Común en todas las praderas tanto bajas como altas". Specimens collected in Prov. Buenos Aires, Sierra de la Ventana, Valle de las Vertientes in 1895 by C. Spegazzini.

Hypochaeris variegata (Lam.) Baker var. ***nana*** Speg., Contr. Fl. Sierra Vent.: 39. 1896.

Current name: *Hypochaeris variegata* (Lam.) Baker.

Exsicc.: Argentina, Prov. Buenos Aires, "Hab. In pratis Sierrae Ventanae, Nov. 95 [1895]". C. Spegazzini. Holotype (Bortiri 1995, in sched.). The sheet contains a brief diagnosis made in Spegazzini's hand.

Protologue: The locality is only cited for the species *Hypochaeris variegata*: "Común en todas las praderas tanto bajas como altas". Specimens collected in Prov. Buenos Aires, Sierra de la Ventana, Valle de las Vertientes in 1895 by C. Spegazzini.

Hypochaeris variegata (LAM.) BAKER var. ***pinnatifida*** SPEG., Contr. Fl. Sierra Vent.: 40. 1896.

Current name: *Hypochaeris rosengurtii* CABRERA var. *pinnatifida* (SPEG.) CABRERA.

Exsicc.: Argentina, Prov. Buenos Aires, "Hab. In pratis Sierrae Ventanae, Nov. 95 [1895]". C. SPEGAZZINI. Holotype (BORTIRI 1995, in sched.).

Protologue: The locality is only cited for the species *Hypochaeris variegata*: "Común en todas las praderas tanto bajas como altas". Specimens collected in Prov. Buenos Aires, Sierra de la Ventana, Valle de las Vertientes in 1895 by C. SPEGAZZINI.

Hypochaeris variegata (LAM.) BAKER var. ***variegata*** (as "*typica*"), Contr. Fl. Sierra Vent.: 40. 1896.

Current name: *Hypochaeris variegata* (LAM.) BAKER.

Exsicc.: Argentina, Prov. Buenos Aires, "Hab. In pratis Sierrae Ventanae, Nov. 95 [1895]". C. SPEGAZZINI. Probable original material.

Protologue: The locality is only cited for the species *Hypochaeris variegata*: "Común en todas las praderas tanto bajas como altas". Specimens collected in Prov. Buenos Aires, Sierra de la Ventana, Valle de las Vertientes in 1895 by C. SPEGAZZINI.

Leucheria (as "*Leuceria*") ***eriocephala*** SPEG., Anales Soc. Ci. Argent. 53: 31. 1902.

Current name: same as above.

Exsicc.: Argentina, Prov. Santa Cruz, "Karr-aik (Lago Argentino) Patagonia, Aest. 3/98 [1898], C. AMEG." (LPS 1891). Holotype. The sheet contains the inscription "n. sp." made in SPEGAZZINI's hand. Annotated "tipo!" by A. L. CABRERA (in sched.).

Protologue: "Hab. In rupestribus montanis Karr-aik prope Lago Argentino, Mrt. 1898 (C.A.)".

Leucheria (as "*Leuceria*") ***ibari*** PHIL. var. ***glandulosa*** SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 538. 1897.

Current name: *Leucheria achillaeifolia* HOOK. et ARN.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "Hab. S. Cruz, 2/1882, C. S.". Probable original material.

(b) Argentina, Prov. Santa Cruz, "S. Cruz, 1882, C. S.". Probable original material.

Protologue: The locality is only cited for the species *Leuceria ibari*: "Hab. Non rara in pratis editioribus secus Río Gallegos et Río Santa Cruz , anno 1882 (C. S.), prope Lago Argentino, anno 1884 (T. F.) et in Golfo de San Jorge, anno 1896 (C. A.)".

Obs.: Probably the sequence of localities and years of collections correspond with the order in which the varieties where described, i.e., 1882 for *Leucheria ibari* var. *glandulosa*, 1884 for *Leucheria ibari* var. *glabrata* (see specimens that are not deposited in LP), and 1896 for *Leucheria ibari* var. *sessiliflora*. CRISCI (1976a) cites the specimen with the label: "Patagonia austral, Río Santa Cruz, VIDAL s.n. (SGO 60861) as the type of *Leuceria ibari*.

Leucheria (as "*Leuceria*") ***ibari*** PHIL. var. ***sessiliflora*** SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 538. 1897.

Current name: same as above.

Exsicc.: Argentina, Prov. Santa Cruz, "Hab. S. Jorge (C. AMEGHINO) 2/96". Probable original material.

Protologue: The locality is only cited for the species *Leuceria ibari*: "Hab. Non rara in pratis editioribus secus Río Gallegos et Río Santa Cruz , anno 1882 (C. S.), prope Lago Argentino, anno 1884 (T. F.) et in Golfo de San Jorge, anno 1896 (C. A.)".

Obs.: Probably the sequence of localities and years of collections correspond with the order in which the varieties where described, i.e., 1882 for *Leucheria ibari* var. *glandulosa*, 1884 for *Leucheria ibari* var. *glabrata* (see specimens that are not deposited in LP), and 1896 for *Leucheria ibari* var. *sessiliflora*. Annotated by C. SPEGAZZINI "*Leucheria ibarii* var. *sessiliflora*. CRISCI (1976a) cites the specimen with the label: "Patagonia austral, Río Santa Cruz, VIDAL s.n. (SGO 60861) as the type of *Leuceria ibari*.

Leucheria (as "*Leuceria*") ***patagonica*** SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 538. 1897.

Current name: *Leucheria hahnii* FRANCH.

Exsicc.: Argentina, Prov. Santa Cruz, "Hab. S. Cruz" (LPS 1888). Holotype (CRISCI 1976a). The sheet contains the inscription "n. sp.", a brief diagnosis, and a full description made in SPEGAZZINI's hand.

Protologue: "Hab. In pratis collinis prope Lago Argentino, anno 1884 (T. F.)".

Mutisia chubutensis SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 612. 1897.

Current name: *Mutisia spinosa* RUIZ et PAV. var. *spinosa.*

Exsicc.: Argentina, Prov. Chubut, "Chubut, 1889, C. MOYANO" (LPS 673). Holotype. The sheet contains the inscription "n. sp.", a brief diagnosis, and a full description made in SPEGAZZINI's hand.

Protologue: "Hab. In dumetis collinis praeandinis sporadice". Specimens collected in Prov. Chubut in 1889 by C. MOYANO.

Mutisia moyanoi SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 613. 1897.

Current name: *Mutisia spinosa* RUIZ et PAV. var. *spinosa.*

Exsicc.: Argentina, Prov. Chubut, "Chubut, 1889, C. MOYANO" (LPS 671). Holotype. The sheet contains the inscription "n. sp.", a brief diagnosis, and a full description made in SPEGAZZINI's hand.

Protologue: "Hab. In dumetis collinis praeandinus secus Carren-leofú". Specimens collected in Prov. Chubut in 1889 by C. MOYANO.

Mutisia pulchella SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 614. 1897.

Current name: *Mutisia spinosa* RUIZ et PAV. var. *pulchella* (SPEG.) CABRERA.

Exsicc.: Argentina, Prov. Chubut, "Chubut, 1889, C. MOYANO" (LPS 672). Holotype. The sheet contains the inscription "n. sp.", a brief diagnosis, and a full description made in SPEGAZZINI's hand.

Protologue: "Hab. In dumetis collinis et montanis praeandinis". Specimens collected in Prov. Chubut in 1889 by C. MOYANO.

Nassauvia abbreviata (HOOK. et ARN.) DUSÉN var. ***azorelloides*** SPEG., Anales Soc. Ci. Argent. 53: 33. 1902.

Current name: *Nassauvia aculeata* (LESS.) POEPP. et ENDL. var. *azorelloides* (SPEG.) CABRERA.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "Sehuen-aik (Río Sehuen), Patagonia, Aest. 2-98 [1898], C. AMEG." (LPS 1902). Lectotype. Cited as "typus" by CABRERA (1982). Annotated "Tipo!" by A. L. CABRERA (in sched.).

(b) Argentina, Prov. Santa Cruz, "Santa Cruz, Sehuen-aik (Río Sehuen), Patagonia, Aest. 2-98 [1898], C. AMEG.". (LP 74994). Isolectotype. Label transcription made by A. L. CABRERA.

(c) Argentina, Prov. Santa Cruz, "Terrenos húmedos, altas mesetas, Karr-aik (Lago Argentino) Patagonia, Aest. 3-98 [1898], C. AMEG." (LPS 1901). Paralectotype. Annotated "Cotipo!" by A. L. CABRERA (in sched.). The sheet contains a brief diagnosis made in SPEGAZZINI's hand.

Protologue: "Hab. Non rara in rupestribus uliginosis Sehuen-aik secus Río Sehuen, Febr. et in Karr-aik prope Lago Argentino, Mart. 1898 (C.A.)".

Obs.: There is a full description made in SPEGAZZINI's hand.

Nassauvia ameghinoi SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 542. 1897.

Current name: same as above.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "S. Jorge, 2/96 [1896]" (LPS 1895). Holotype. The sheet contains the inscription "n. sp." made in SPEGAZZINI's hand.

(b) Argentina, Prov. Santa Cruz, "S. Jorge, 2/96 [1896]" (LP 75006). Isotype. Label transcription made by A. L. CABRERA.

Protologue: "Hab. Non rara in valleculis glareosis aridis prope Golfo de San Jorge, anno 1896 (C. A.)".

Nassauvia argyrophylla Speg. ex Cabrera, Notas Mus. La Plata 4: 160. 1939.

Current name: same as above.

Exsicc.: (a) Argentina, Prov. Chubut, "Rio Corcovado (71° long. Greenw., 43° lat. S.), (1-15) III 1901, Leg. Dr. Nicolás Illin" (LP 63052). Holotype. Annotated "*Nassauvia argyrophylla* Speg." in Spegazzini's hand.

(b) Argentina, Prov. Chubut, "Lago Villarino, 1896, Rec. por S. Roth" (LP 6094). Probable non original material. Annotated "*Nassauvia argyrophylla* Speg." in Spegazzini's hand.

(c) Argentina, Prov. Chubut-Río Negro, "Alrededores del lago Nahuel-Huapi, 1896, Rec. por S. Roth" (LP 6095). Probable non original material. Annotated "*Nassauvia argyrophylla* Speg." in Spegazzini's hand.

Protologue: "Chubut, Río Corcovado, Comparia Nafofocahuel, N. Illi [sic], n° 254, III-1901".

Obs.: This species, cited as *Nassauvia argyrophylla* Speg. ex Hosseus [in "Trab. Inst. Bot. & Farmacol. 33, 95 (1915), nomen"] in the Index Kewensis, was described and published by Cabrera in 1939.

Nassauvia axillaris (Lag. ex Lindl.) D. Don var. ***contracta*** Speg., Anales Soc. Ci. Argent. 53: 67.1902.

Current name: *Nassauvia glomerulosa* (Lag. ex Lindl.) D. Don.

Exsicc.: Argentina, Prov. Santa Cruz, "Pan de Azúcar (Río Chico), Patagonia, Aest. 12/1897, C. Ameg." (LPS 1909). Holotype.

Protologue: "Hab. In rupestribus aridis Pan de Azúcar vocatis secus Río Chico, Dec. 1897 (C. A.)".

Nassauvia chubutensis Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 615. 1897.

Current name: same as above.

Exsicc.: (a) Argentina, Prov. Chubut, "Chubut, 1889, C. Moyano" (LPS 1899). Holotype. Annotated "Cotipo?" by A. L. Cabrera (in sched.).

(b) Argentina, Prov. Chubut, "Chubut, 1889, C. MOYANO" (LP 75030). Isotype. Label transcription made by A. L. CABRERA.

Protologue: "Hab. Vulgata in valleculis glareoso-sabulosis aridis prope Teka-choique". Specimens collected in Prov. Chubut in 1889 by C. MOYANO.

Nassauvia patagonica SPEG. var. ***elatior*** SPEG., Anales Soc. Ci. Argent. 53: 67. 1902.

Current name: *Nassauvia ulicina* (HOOK. f.) MACLOSKIE.

Exsicc.: Argentina, Prov. Santa Cruz, "Pan de Azúcar (Río Chico) Patagonia, Aest. 12/1897, C. AMEGH." (LPS 1904). Holotype. Annotated "tipo!" by A. L. CABRERA (in sched.).

Protologue: "Hab. In aridissimis saxosis collinis Pan de Azucar vocatis secus Río Chico, Dec. 1897 (C. A.)".

Nassauvia patagonica SPEG. var. ***patagonica***, Revista Fac. Agron. Univ. Nac. La Plata 3: 543. 1897.

Current name: *Nassauvia ulicina* (HOOK. f.) MACLOSKIE.

Exsicc.: Argentina, Prov. Santa Cruz, "Hab. S. Jorge (C. AMEGHINO 2/96 [1896])" (LPS 1905). Holotype. The sheet contains the inscription "n. sp.", a brief diagnosis, and a full description made in SPEGAZZINI's hand. Annotated "tipo!" by A. L. CABRERA (in sched.).

Protologue: "Hab. In campis glareosis aridissimis prope Golfo de San Jorge, anno 1896 (C. A.)".

Nassauvia pentacaenoides SPEG., Anales Soc. Ci. Argent. 53: 34.1902.

Current name: same as above.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "En pendientes desnudas aridísimas Karr-aik (Lago Argentino) Patagonia, Aest. 3/98 [1898], C. AMEGH." (LPS 1896). Holotype. The sheet contains the inscription "n. sp." made in SPEGAZZINI's hand. Annotated "tipo!" by A. L. CABRERA (in sched.).

(b) Argentina, Prov. Santa Cruz, "En pendientes desnudas aridísimas Karr-aik (Lago Argentino) Patagonia, Aest. 3/98 [1898], C. AMEGH." (LP 76042).

Isotype. Label transcription made by A. L. Cabrera.

Protologue: "Hab. In declivi aridissimo denudato montium Karr-aik prope Lago Argentino Mart. 1898 (C. A.)".

Obs.: There is a full description made in Spegazzini's hand.

Nassauvia struthionum (Phil.) Speg. var. ***robusta*** Speg., Anales Soc. Ci. Argent. 53: 68. 1902.

Current name: *Nassauvia glomerulosa* (Lag. ex Lindl.) D. Don.

Exsicc.: Argentina, Prov. Santa Cruz, "Karr-aik (Lago Argentino), Santa Cruz, Aest. 3/98 [1898], C. Ameg." (LPS 16913). Holotype.

Protologue: "Hab. In rupestribus aridissimis Karr-aik, prope Lago Argentino, Mart. 1898 (C. A.)".

Perezia megalantha Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 540. 1897.

Current name: same as above.

Exsicc.: (a) LPS 1890. Holotype. (Simpson Vuilleumier 1969). Annotated "Type" by B. Simpson and "Tipo!" by A. L. Cabrera (in sched.).

(b) Argentina, Prov. Santa Cruz, "S. Cruz, 1882, C. S." (LPS 1892). Probable non original material. Annotated "Isotype" by B. Simpson (in sched.). The sheet contains the inscription "n. sp." made in Spegazzini's hand.

Protologue: "Hab. In pratis collinis prope Lago Argentino, anno 1884 (T.F.)".

Obs.: There is a full description made in Spegazzini's hand.

Perezia pampeana Speg., Contr. Fl. Tandil: 33. 1901.

Current name: *Criscia stricta* (Spreng.) Katinas.

Exsicc.: Argentina, Prov. Buenos Aires, "Tandil, Prov. Buenos Aires, I-1901, C. Spegazzini" n. 2754 (LPS 21799, LP 560680). Lectotype (Katinas 1994). Label transcription made by A. L. Cabrera.

Protologue: "Bastante frecuente en todos los cerros fértiles y pastosos; observé esta especie también entre las Estaciones General Dorrego y Bajo Hondo, hacia Bahía Blanca". Specimens collected in Prov. Buenos Aires, Sierras de Tandil, by C. Spegazzini in 1898.

Perezia patagonica Speg. var. ***intermedia*** Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 615. 1897.

Current name: *Perezia recurvata* (Vahl) Less.

Exsicc.: Argentina, Prov. Chubut, "Hab. Chubut, 1889, C. Moyano". Probable original material. Cited by Simpson Vuilleumier (1969): "Type: Argentina. Chubut: without locality, 1889, Moyano s.n. (LP)".

Protologue: "Hab. In aridis secus Río Chubut prope Coloniam Gaëlicam". Specimens collected in Prov. Chubut in 1889 by C. Moyano.

Obs.: The specimen was found mixed with non type material, without any annotation as a type specimen.

Perezia patagonica Speg. var. ***patagonica***, Revista Fac. Agron. Univ. Nac. La Plata 3: 540. 1897.

Current name: *Perezia recurvata* (Vahl) Less.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "Hab. Golfo S. Jorge, II/96 [1896], C. Ameghino". Syntype. The sheet contains the inscription "n. sp." and a brief diagnosis made in Spegazzini's hand.

(b) Argentina, Prov. Chubut, "Chubut, 1889, C. Moyano". Lectotype? Annotated "type" by B. Simpson (in sched.).

(c) Argentina, Prov. Santa Cruz, "Hab. S. Cruz". Isolectotype. The sheet contains the inscription "n. sp." made in Spegazzini's hand. Annotated "isotype" by B. Simpson (in sched.).

(d) Argentina, Prov. Santa Cruz. "Golfo S. Jorge, II/96 [1896], C. Ameghino" (LP 65694). Syntype. Label transcription made by A. L. Cabrera. Annotated "Cotipo" by A. L. Cabrera (in sched.).

Protologue: "Hab. In dunis maritimis secus Rio Santa Cruz, anno 1882 (C. S.) et in Golfo de San Jorge, Febr. 1896 (C. A.)".

Obs.: SIMPSON VUILLEUMIER (1969) cites in her revision of *Perezia*: "Type: Argentina. Santa Cruz, 1882, SPEGAZZINI s.n. (LP)". These data coincide only with the specimen (c), which was annotated "isotype" by VUILLEUMIER (in sched.).

There is a full description made in SPEGAZZINI's hand.

Perezia sessiliflora SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 542. 1897.

Current name: *Burkartia lanigera* (HOOK. et ARN.) CRISCI.

Exsicc.: Argentina, Prov. Santa Cruz, "Río Santa Cruz, Santa Cruz, 1882, C. SPEGAZZINI" (LP 65752). Lectotype (CRISCI 1976b). Label transcription made by A. L. CABRERA.

Protologue: "Hab. Non rara in campis aridis glareosis prope Rio Santa Cruz, anno 1882 (C. S.) et prope Rio Deseado et Golfo San Jorge, annis 1894-96 (C. A.)".

Senecio ameghinoi SPEG., Anales Soc. Ci. Argent. 53: 17. 1902.

Current name: same as above.

Exsicc.: (a) Argentina, Prov. Chubut, "Col-Huapi, Chubut, Aut. 1900, C. AMEGHINO". Holotype. The sheet contains the inscription "n. sp." and a brief diagnosis made in SPEGAZZINI's hand.

(b) Argentina, Prov. Chubut, "Col-Huapi, Chubut, Aut. 1900, C. AMEGHINO" (LP 64408). Isotype. Label transcription made by A. L. CABRERA.

Protologue: "Hab. In aridis saxosis prope Lago Colu-huapi, Chubut, aut. 1900 (C. A.)".

Senecio argentinensis SPEG., Com. Mus. Nac. B. Aires 1: 52. 1898.

Current name: *Senecio tweediei* HOOK. et ARN.

Exsicc.: (a) Argentina, Prov. Buenos Aires, "Alrededores de La Plata, In horto meo 56-10 Jan. 1897, C. SPEGAZZINI" (LPS 2393). Syntype (stamped as "Cotypus").

(b) Argentina, Prov. Buenos Aires, "La Plata: sponte in horto meo, I-1897, C. Spegazzini" (LP 62845). Syntype. Label transcription made by A. L. Cabrera.

Protologue: "Hab. Ad muros vetustos in urbe Buenos Aires et in ruderatis prope La Plata, rarus per annis 1890-94".

[***Senecio bettfreundii*** Speg.]

Protologue: Argentina, Prov. Chubut, Cabo Raso, "*Senecio Bettfreundii* Speg. Cf. tipo coll. 20, 12, 1899, Bettfreund. E. Müller, nº 50. Enero, Febrero 1915. Lugar: entre piedras, tierra húmeda."

Obs.: Probably a nomen nudum. Not cited in the Index Kewensis and cited by Hosseus (1915) as to be published in a future floristic treatment of the area. This flora, however, was not published and the description of this species has not been found in any publication of Spegazzini.

Senecio capillarifolius Speg., Anales Soc. Ci. Argent. 53: 18. 1902.

Current name: *Senecio chrysocomoides* Hook. et Arn.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "S. Julian-R. Deseado, vere 1899, C. Ameghino" (LPS 1005). Lectotype (Cabrera 1971). The sheet contains the inscription "n. sp." and a brief diagnosis made in Spegazzini's hand. Annotated "Tipo!" by A. L. Cabrera (in sched.).

(b) Argentina, Prov. Santa Cruz, "S. Julian-R. Deseado, vere 1899, C. Ameghino" (LP 64620). Isolectotype. Label transcription made by A. L. Cabrera. Annotated "duplicado del tipo" by A. L. Cabrera (in sched.).

Protologue: "Hab. In aridis inter S. Julian et Río Deseado, vere 1898 (C.A.) et secus Río Chubut, aest. 1899 (N. Illin)".

Senecio choiquelauensis Speg., Anales Soc. Ci. Argent. 53: 16.1902.

Current name: *Senecio patagonicus* Hook. et Arn. var. *patagonicus*.

Exsicc.: Argentina, Prov. Chubut, "Hab. In aridis prope Choique-lauen, Aest. 1899 (N. Illin)" (LPS 1747). Holotype. Annotated "tipo!" by A. L. Cabrera (in sched.). The sheet contains the inscription "n. sp." and a brief diagnosis made in Spegazzini's hand.

Protologue: "Hab. In aridiis saxosis prope Choique-lauen, Aut. 1899".

Obs.: The protologue says "Aut." whereas the label says "Aest.".

Senecio chubutensis Speg., Anales Soc. Ci. Argent. 53: 19. 1902.

Current name: *Senecio chrysocomoides* Hook. et Arn.

Exsicc.: (a) Argentina, Prov. Chubut, "Chubut, 1899" (LPS 1003). Holotype. Annotated "tipo!" by A. L. Cabrera (in sched.). The sheet contains the inscription "n. sp." and a brief diagnosis made in Spegazzini's hand.

(b) Argentina, Prov. Chubut, "In collinis secus Rio Carren-leofú, Chubut, Aest. 1899, N. Illin" (LPS 1002, LP 64619). Isotype (A. L. Cabrera, in sched.). Label transcription made by A. L. Cabrera.

Protologue: "Hab. In altiplanitie aridissima prope Choiquelauen, Febr. 1899 (N. Illin)".

Senecio colu-huapiensis Speg., Anales Soc. Ci. Argent. 53: 15. 1902.

Current name: same as above.

Exsicc.: (a) Argentina, Prov. Chubut, "Col-huapi, Chubut, aut. 1900, C. Ameghino" (LPS 12692). Holotype. The sheet contains the inscription "n. sp." and a brief diagnosis made in Spegazzini's hand.

(b) Argentina, Prov. Chubut, "Col-huapi, Chubut, aut. 1900, C. Ameghino" (LP 64655). Isotype. Label transcription made by A. L. Cabrera.

Protologue: "Hab. In aridis sabulosis prope Lago Colu-huapi, Aut. 1900 (C. A.)".

[***Senecio desideratus*** DC. f. ***elatiusculus*** (as "*elatiuscula*") Speg.]

Protologue: "*Senecio ctenophyllus* O. Kuntze l.c. 172 non R. A. Phil. (Patagonia; Moreno et Tonini n^{os} 508, 514), est *S. desideratus* DC. Prodr. VI. 413, f. *elatiuscula*.- (C. Speg. in litt.)."

Obs.: Probably a nomen nudum. Cited in the Gray Card Index as published in Bol. Acad. Ci. (Córdoba) 16: 235. 1899. The diagnosis of this form, however, was not found in this nor in other literature of Spegazzini. There is a specimen deposited in LP that could correspond with the protologue: Argentina, Prov. (?), "Hab. Patagonia, *Senecio ctenophyllus* Ph. (OK!) typus, 508, 580" (LP 64737). The sheet contains a brief diagnosis (in two labels) made in Spegazzini's hand. This specimen, close to *Senecio desideratus*, was probably never described by Spegazzini.

Senecio inutilis Speg., Anales Soc. Ci. Argent. 53: 21. 1902.

Current name: *Senecio bracteolatus* Hook. et Arn. var. *valderramae* (Phil.) Cabrera.

Exsicc.: Argentina, Prov. Chubut, "Hab. In aridis prope 'Cabo Raso' Chubut, 3/97 [1897], E. Fischer" (LP 64290). Holotype. The sheet contains the inscription "n. sp." made in Spegazzini's hand.

Protologue: "Hab. In saxosis altiplanitiei prope Cabo Raso, Chubut, Aut. 1897 (E. Fischer)".

Senecio julianus Speg., Anales Soc. Ci. Argent. 53: 13. 1902.

Current name: same as above.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "S. Julian-R. Deseado, Vere 1899, C. Ameghino". Holotype. The sheet contains the inscription "n. sp." and a brief diagnosis made in Spegazzini's hand.

(b) Argentina, Prov. Santa Cruz, "S. Julian-R. Deseado, Vere 1899, C. Ameghino" (LP 64478). Isotype. Label transcription made by A. L. Cabrera.

Protologue: "Hab. In pratis sabulosis siccioribus prope S. Julian, vere 1899 (C. A.)".

Senecio miser Hook. f. var. ***tehuelches*** Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 535. 1897.

Current name: *Senecio tehuelches* (Speg.) Cabrera.

Exsicc: Argentina, Prov. Santa Cruz, "Hab. Deseado" (LPS 10708). Holotype. The sheet contains the inscription "n. sp." , "*Senecio tehuelches*", and a full description made in Spegazzini's hand.

Protologue: "Hab. In dumetis maritimis prope Rio Deseado, anno 1894 (C. A.)".

Senecio mustersii (as "*mustersi*") SPEG., Anales Soc. Ci. Argent. 53: 22. 1902.

Current name: *Senecio mustersii* SPEG. var. *mustersii.*

Exsicc.: (a) Argentina, Prov. Chubut, "Hab. camino entre Choiquelauen y el Lago Musters, 15/1-25/1/99 [= 15-25 January 1899], (N. ILLIN)" (LPS 12691). Lectotype (CABRERA 1971). Stamped as "Typus". The sheet contains the inscription "n. sp." and a brief diagnosis made in SPEGAZZINI's hand.

(b) Argentina, Prov. Chubut, "Hab. camino entre Choiquelauen y el Lago Musters, 15/1-25/1/99, (N. ILLIN)" (LP 64883). Isolectotype. Label transcription made by A. L. CABRERA.

Protologue: "Hab. In altiplanitie aridissima prope Lago Musters, Jan. 1899 (N. ILLIN) et secus Río S. Cruz, Mart. 1898 (S. VENTURI)".

Senecio sagittarioides SPEG., Contr. Fl. Sierra Vent.: 37. 1896.

Current name: *Senecio bonariensis* HOOK. et ARN.

Exsicc.: Argentina, Prov. Buenos Aires, "Hab. In viridis Sierrae Ventanae, Nov. 95 [1895]" (LPS 10693). Holotype. The sheet contains the inscription "n. sp." and a brief diagnosis made in SPEGAZZINI's hand.

Protologue: "Común en todos los arroyos y en los lugares bajos y húmedos del valle". Specimens collected in Prov. Buenos Aires, Sierra de la Ventana, Valle de las Vertientes in 1895 by C. SPEGAZZINI.

[***Senecio sericeo-nitens*** SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 537. 1897, nomen novum]

Current name: same as above.

Protologue: "Hab. Non rarus in altiplanitie glareosa prope Río Gallegos et Río Santa Cruz, anno 1882 (C. S.), apud Río Deseado et in Golfo de San Jorge anno 1896 (C. A.)" .

Obs.: According to CABRERA (1971: 187) it is a nomen novum pro *Senecio patagonicus* PHIL. non HOOK. et ARN.

Senecio xanthoxylon PHIL. var. ***araneosula*** SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 535. 1897.

Current name: *Senecio patagonicus* HOOK. et ARN. var. *alyssoides* (SCH. BIP.) CABRERA.

Exsicc.: (a) Argentina, Prov. Santa Cruz, "Santa Cruz, Río Santa Cruz, I-1882, C. SPEGAZZINI" (LP 65170). Holotype.

(b) Argentina, Prov. Santa Cruz, "Santa Cruz, Río Santa Cruz, I-1882, C. SPEGAZZINI" (LP 65167). Isotype. Label transcription made by A. L. CABRERA.

(c) Argentina, Prov. Santa Cruz, "Santa Cruz, Río Santa Cruz, I-1882, C. SPEGAZZINI" (LP 64780). Isotype. Label transcription made by A. L. CABRERA.

Protologue: "Hab. Non rarus in dunis maritimis Isla de los Leones in Río Santa Cruz, anno 1882 (C. S.)".

Solidago linearifolia DC. var. ***brachypoda*** SPEG., Revista Fac. Agron. Univ. Nac. La Plata 3: 610. 1897.

Current name: *Solidago chilensis* MEYEN var. *chilensis*.

Exsicc.: Argentina, Prov. Chubut, "Chubut, 1889, C. MOYANO" (LPS 17288). Probable original material. The sheet contains the inscription "*S. linearifolia* var. *brachypoda*", and a brief diagnosis, both made in SPEGAZZINI's hand.

Protologue: "Hab. In sylvosis editioribus secus Rio Carren-leofú". Specimens collected in Prov. Chubut in 1889 by C. MOYANO.

Strongylomopsis SPEG.

Current name: *Nassauvia* COMM. ex JUSS.

Strongylomopsis fuegiana SPEG., Com. Mus. Nac. B. Aires 1: 135. 1899.

Current name: *Nassauvia fuegiana* (SPEG.) CABRERA.

Exsicc.: Argentina, Prov. Tierra del Fuego, Antártida e Islas del Atlántico Sur, "En golfo de S. Sebastian; Jan. 1896" (LPS 1908). Holotype. Annotated "tipo!" by A. L. CABRERA (in sched.).The sheet contains the inscription "n. sp." made in SPEGAZZINI's hand.

Protologue: "Hab. In dunis maritimis, Golfo de S. Sebastian, Fuegia orientali, Jan. 1896 (leg. O. MAURI)".

Triptilion achilleae (as "*achillea*") DC. var. ***glabriceps*** SPEG., Anales Soc. Ci. Argent. 53: 69. 1902.

Current name: *Triptilion achilleae* DC.

Exsicc.: The label lacks data. It is annotated "varietas typo", and has a brief diagnosis in SPEGAZZINI's hand. Holotype (KATINAS et al. 1992).

Protologue: "Hab. In campis saxosis aridis prope Lago Nahuel-huapi, Dec. 1897 (C. S.)".

Specimens not found in LP

Baccharis tandilensis SPEG., Contr. Fl. Tandil: 26. 1901.

Current name: same as above.

Protologue: "Es el único arbusto de alguna elevación (de 50 á 150 cm alt.) que se observa en la cumbre de los cerros del Tandil". Specimens collected in Prov. Buenos Aires, Sierras de Tandil by C. SPEGAZZINI in 1898.

Chiliotrichum diffusum (G. FORST.) KUNTZE var. ***media*** Speg., Anales Soc. Ci. Argent. 48: 186. 1899.

Current name: *Chiliotrichum diffusum* (G. FORST.) KUNTZE.

Protologue: "Hab. In Chubut centrali, Nov. 1898 (sine n., J. KOSLOWSKY)."

Erigeron bonariensis L. f. ***glabrata*** SPEG., Anales Soc. Ci. Argent. 48: 240. 1899.

Current name: *Conyza floribunda* KUNTH.

Protologue: "Hab. Vulgatus in dumetis secus flumen Río Negro, Febr. 1898 (C. S.)".

Erigeron philippii Sch. Bip. ex Wedd. f. ***humilis*** Speg., Anales Soc. Ci. Argent. 48: 241. 1899.

Current name: The species *Erigeron philippii* was referred to *E. myosotis* Pers. by Solbrig (1962).

Protologue: The locality is only cited for the species *Erigeron philippii*: "Hab. In rupestribus aridis loco Karr-aik vocato prope Lago Argentino, Mart. 1898 (C. A.)".

Eupatorium commersonii (Cass.) Hieron. var. ***dentata*** Speg., Contr. Fl. Tandil: 24. 1901.

Current name: *Eupatorium commersonii* (Cass.) Hieron.

Protologue: The locality is only cited for the species *Eupatorium commersonii*: "Abundante en todas partes, tanto en lugares secos como húmedos de las sierras". Specimens collected in Prov. Buenos Aires, Sierras de Tandil by C. Spegazzini in 1898.

Flotovia stifftioides Speg., Anal. Soc. Rural Argent.: 404. 1910.

Current name: *Dasyphyllum diacanthoides* (Less.) Cabrera.

Protologue: Argentina, Patagonia "N°. 499 (XXVII N [Neuquén])" V-1909/V-1910, leg. H. Giovanelli.

Obs.: This material corresponds to a wood samples collection showed in an international exhibition held in Buenos Aires in 1910. The collectors were A. Snaider in Tierra del Fuego, H. Giovanelli in Patagonia, and S. Venturi in the remaining areas of Argentina. They were instructed to collect samples of trunks and, whenever possible, living and herborized material of the same specimen. This material was received by Spegazzini in Oficina de la Sección botánica del M. N. de Agricultura (currently BAB) (Spegazzini 1925).

Leucheria (as "*Leuceria*") ***ibari*** Phil. var. ***glabrata*** Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 538. 1897.

Current name: *Leucheria achillaeifolia* Hook. et Arn.

Protologue: The locality is only cited for the species *Leuceria ibari*: "Hab. Non rara in pratis editioribus secus Río Gallegos et Río Santa Cruz , anno

1882 (C. S.), prope Lago Argentino, anno 1884 (T. F.) et in Golfo de San Jorge, anno 1896 (C. A.)".

Obs.: Probably the sequence of localities and years of collections correspond with the order in which the varieties where described, i.e., 1882 for *Leucheria ibari* var. *glandulosa*, 1884 for *Leucheria ibari* var. *glabrata*, and 1896 for *Leucheria ibari* var. *sessiliflora*.

Senecio diabolicus Speg., Anales Soc. Ci. Argent. 53: 20. 1902.

Current name: *Senecio bracteolatus* Hook. et Arn. var. *bracteolatus*.

Protologue: "Hab. In aridis prope Cabo Raso, Chubut, aest. 1885 (E. Fischer)".

Vernonia oreophila Speg., Contr. Fl. Tandil: 22. 1901.

Current name: *Vernonia echioides* Less.

Protologue: "A lo largo de los valles en las sierras". Specimens collected in Prov. Buenos Aires, Sierras de Tandil by C. Spegazzini in 1898.

Obs.: Cabrera (1939: 16) cites the type specimen as deposited in BAB.

List of LPS numbers

LPS nº	**Taxa**
20	*Grindelia speciosa* Gillies ex Hook. et Arn. var. *glabrata* Speg.
33	*Haplopappus patagonicus* Speg.
34	*Haplopappus patagonicus* Speg.
79	*Haplopappus ameghinoi* Speg.
92	*Haplopappus moyanoi* Speg.
97	*Haplopappus struthionum* Speg.
98	*Haplopappus struthionum* Speg.
100	*Haplopappus illinii* Speg.
131	*Haplopappus ameghinoi* Speg.

671	*Mutisia moyanoi* Speg.
672	*Mutisia pulchella* Speg.
673	*Mutisia chubutensis* Speg.
675	*Haplopappus mustersii* Speg.
1002	*Senecio chubutensis* Speg.
1003	*Senecio chubutensis* Speg.
1005	*Senecio capillarifolius* Speg.
1747	*Senecio choiquelauensis* Speg.
1888	*Leucheria patagonica* Speg.
1890	*Perezia megalantha* Speg.
1891	*Leucheria eriocephala* Speg.
1892	*Perezia megalantha* Speg.
1894	*Erigeron erianthus* Speg.
1895	*Nassauvia ameghinoi* Speg.
1896	*Nassauvia pentacaenoides* Speg.
1897	*Hieracium antarcticum* d´Urv. f. *fuegiensis* Speg.
1899	*Nassauvia chubutensis* Speg.
1901	*Nassauvia abbreviata* (Hook. et Arn.) Dusén var. *azorelloides* Speg.
1902	*Nassauvia abbreviata* (Hook. et Arn.) Dusén var. *azorelloides* Speg.
1904	*Nassauvia patagonica* Speg. var. *elatior* Speg.
1905	*Nassauvia patagonica* Speg. var. *patagonica*
1908	*Strongylomopsis fuegiana* Speg.
1909	*Nassauvia axillaris* (Lag. ex Lindl.) D. Don var. *contracta* Speg.
2393	*Senecio argentinensis* Speg.
10141	*Hieracium chubutense* Speg.
10693	*Senecio sagittarioides* Speg.
10708	*Senecio mise*r Hook. f. var. *tehuelches* Speg.

10728	*Senecio desideratus* DC. f. *elatiusculus* Speg.
11052	*Brachycladus megalanthus* Speg.
11053	*Brachycladus megalanthus* Speg.
11432	*Gutierrezia paniculata* (DC.) Phil. var. *patagonica* Speg.
11435	*Gutierrezia ameghinoi* Speg.
11465	*Baccharis melanopotamica* Speg.
11467	*Baccharis melanopotamica* Speg.
11468	*Baccharis melanopotamica* Speg.
11490	*Baccharis trimera* (Less.) DC. var. *viscosissima* Speg.
11508	*Baccharis chubutensis* Speg.
12690	*Culcitium sessile* Speg.
12691	*Senecio mustersii* Speg.
12692	*Senecio colu-huapiensis* Speg.
13073	*Culcitium sessile* Speg.
13685	*Eupatorium commersonii* (Cass.) Hieron. var. *pinnata* Speg.
16775	*Baccharis chubutensis* Speg.
16913	*Nassauvia struthionum* (Phil.) Speg. var. *robusta* Speg.
17189	*Chiliotrichum diffusum* (G. Forst.) Kuntze var. *angustifolium* Speg.
17215	*Erigeron philippii* Sch. Bip. ex Wedd. f. *elatior* Speg.
17217	*Erigeron gayanus* J. Rémy var. *leptophyllus* Speg.
17218	*Erigeron gayanus* J. Rémy var. *leptophyllus* Speg.
17288	*Solidago linearifolia* DC. var. *brachypoda* Speg.
21799	*Perezia pampeana* Speg.

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Pollen morphology and chromosome number of *Vernonia rojasii* (Vernonieae, Asteraceae)

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Abstract

Pollen morphology and chromosome number are reported for the first time in *Vernonia rojasii* Cabrera, an endemic species from central Paraguay. The species presents a somatic chromosome number of $2n=4x=36$, with the karyotype mostly composed by telocentric chromosomes. Pollen grains of *V. rojasii* are triporate, lophate, semitectate, with smooth crests on the muri. This pollen type has been previously called "E" and it is mostly present in Old World species of *Vernonia*. The basic chromosome number $x=9$ found in *V. rojasii* also indicates a probable close relationship with species of Africa and Asia, where this constitutes the more frequent number. In the meanwhile, almost all the American species have different types of tricolporate pollen which have been designated "A", "B", "C" and "D", and present basic chromosome numbers that vary from $x=10$ to $x=19$.

Introduction

Vernonia Schreb. (Vernonieae, Asteraceae) contains approximately 800–1000 species widely distributed in southeastern Asia, Africa and America. The genus is mostly concentrated around two important centres of diversification, the tropical region of Africa and southern Brazil, where about 350–400 species occur (Jones 1977).

During the last years several authors have attempted to clarify the complex taxonomy of the genus (Cabrera 1944, Keeley 1978, Jones 1979a, 1981, Stutts 1988, Robinson 1988a, 1988b, 1989, 1990, 1992a, 1992b, 1992c, 1999). Most of the studies were based on vegetative morphology, while relatively few analyses have considered the chemical composition, pollen morphology or chromosome number. The two latter have shown to be important features in the taxonomy of the genus. Pollen variations in *Vernonia* are numerous and striking (STIX 1960, KINGHAM 1976, KEELEY & JONES 1979) and some of these have been used taxonomically (JONES 1979a, 1981, ROBINSON 1988a, 1988b, 1989, 1990, 1992b, 1992c, 1999). General terminology used for pollen types in tribe Vernonieae dates initially from KEELEY & JONES (1979), who described six pollen classes to which posteriorly were incorporated several additional categories (ROBINSON 1990, 1992a, 1999). A total of ten different pollen types have been recognized in Vernonieae, some of them restricted to New World species while others are distinctive of Old World taxa (JONES 1979a, 1981, ROBINSON 1999).

Chromosome studies performed in the genus indicate certain differences between New and Old World species. The latter entities have basic chromosome numbers x=9 and x=10 (JONES 1979b), while the American taxa present a great diversity of numbers ranging from x=10 to x=19 (KEELEY & TURNER 1990, RUAS et al. 1991, DEMATTEIS & FERNÁNDEZ 1998).

In the present study are analysed for the first time the pollen morphology and chromosomes of *Vernonia rojasii* CABRERA, an endemic species from the Chaco region of Paraguay (CABRERA 1941). This species has remained practically unknown since its original description and relatively few collections have been made. In consequence, the relationships and taxonomic position of this taxon have not been appropriately discussed previously.

Material and Methods

The source of the examined specimens is the following: Paraguay. Dept. Alto Paraguay. 85 km E of Agua Dulce, on the road to Bahía Negra. F. MERELES et al. 6512. Voucher specimens have been deposited at the herbaria of Instituto de Botánica del Nordeste (CTES), Museo de La Plata (LP), Facultad de Ciencias Químicas of the Universidad Nacional de Asunción (FCQ) and the Smithsonian Institution (US).

Pollen material of dried specimens was obtained from the herbarium of Instituto de Botánica del Nordeste (CTES). The pollen grains were acetolysed according to the procedure suggested by ERDTMAN (1966). Due to the considerable exine thickness, sample fragments were bleached with nascent chlorine to allow a better observation.

For light microscopy (LM) the pollen samples were mounted in glycerin-jelly, sealed with paraffin and then examined with a Leitz Ortholux microscope. Permanent slides were deposited at the Palynological Laboratory of the Universidad Nacional del Nordeste (PAL-CTES). Pollen measurements such as polar diameter (P), equatorial diameter (E) and exine thickness are based on 30 grains.

For scanning electron microscopy (SEM) acetolysed pollen grains were first washed in 96 % alcohol and absolute alcohol, posteriorly sputtered with gold palladium and then observed in a JEOL 5800 LV - SEM. The terminology applied for pollen grain description in general follows ERDTMAN (1966), KREMP (1968) and PUNT et al. (1994).

Mitotic chromosome preparations were obtained from root-tips of germinating seeds. The rootlets were pretreated for about 4–4.5 hours in 8-hydroxyquinoline 0.002 M solution, fixed in lactic acid–absolute alcohol (1:5) and stained using the FEULGEN's technique.

Results

Pollen

LM: Pollen triporate, isopolar, radially symmetric; spherical or subspherical and middle sized (Fig. 1). P = 41 (44.6) 47 µm, E = 42 (44.6) 49 µm; P/E = 0.90–1.00. Pores circular, 4 µm diameter. Exine 8.4 µm wide, sexine thicker than nexine, semitectate-reticulate, reticulum homobrochate, rectimurate; muri narrow, ca. 1 µm wide, simplicolumellate, columella irregularly branched in cross-sections; lumina 5–6 polygonal, 7–10.5 µm diameter, lumina enclosing the pores large sized and longitudinally elongated.

SEM: Scanning analysis supports the LM observations and indicates the presence of brief protuberances, like spinules or smooth crests on the muri (Figs. 1–2).

Cytology

Vernonia rojasii showed a somatic chromosome number of 2n=36 (Fig. 3). The size of the chromosomes was relatively small, ranging from 0.76 to 2.05 µm, with a mean length of 1.20 µm. Due to the diminutive chromosome size, it was not possible to determine the karyotype composition, however a considerable proportion of pairs would be apparently telocentrics. The chromosome number found in *V. rojasii* indicates that it is a tetraploid species based on x=9.

Discussion

The pollen of *Vernonia rojasii* is triporate, lophate, semitectate, with smooth crests on the muri. This pollen type has been previously called "E" by Keeley & Jones (1979) and is mostly present in species of the Eastern Hemisphere. In the meanwhile, most of the American species have different types of tricolporate pollen which have been named "A, "B", "C" and "D" (Jones 1979a). The pollen morphology of *V. rojasii* suggests that it would be more closely related to Old World members of *Vernonia* than to other New World taxa. The basic chromosome number x=9 found in *V. rojasii* also indicates a probable close relationship with species of Africa and Asia, where this constitutes the more frequent number. Nevertheless, *V. rojasii* can be distinguished from the latter on the base of its ploidy level (4x). In the Old World, most of the species are diploid and polyploidy is extremely uncommon (Jones 1979b).

The presence of telocentric chromosomes clearly separates *V. rojasii* from the remainder American members of Vernonieae that often have metacentric and submetacentric pairs (Dematteis & Fernández 1998). Only some American species with base number x=16 present occasionally subtelocentric chromosomes, but telocentric pairs are generally absent in the genus *Vernonia* (Dematteis 1998).

The basic chromosome number x=9 has been previously reported for *V. echitifolia* Mart. ex DC., which would likely be closely related to *V. rojasii* taking into account its base number and pollen type. Like *V. rojasii*, this species has type "E" pollen and basic chromosome number x=9, with a karyotype composed of several acrocentric or telocentric pairs (Dematteis & Robinson 1997). Despite its similar pollen type and chromosomes, both entities differ considerably in many other morphological features. *Vernonia echitifolia* is a densely pubescent shrub, covered by reddish glands on leaves, and presents sessile heads 8–13 flowered disposed in axillar location of reduced bracts. On the other hand, *V. rojasii* is a totally glabrous herb, without glands, having pedunculate heads, 90–100 flowered, which are arranged between leafy bracts.

Although the base number x=9 has not been reported for any other New World species, it may be present in some American taxa with type "E" pollen, since there is a clear relationship between pollen morphology and basic chromosome number in the tribe Vernonieae. The groups with tricolporate pollen show basic chromosome numbers x=17, x=16, x=15 and x=14, while the taxa that possess triporate pollen types have base x=8, x=9, x=10, x=11 and x=13 (Robinson 1992a). Two entities that may have x=9 are *Vernonia brunneri* (H. Rob.) Cabr. and *Pacourina edulis* Aubl., which are the only other American taxa with type "E" pollen (Robinson 1992a, 1992b). From these, *V. rojasii* may be more closely related to *V. brunneri*, a species recently described for Paraguay and subsequently also discovered in Bolivia (Robinson 1999). This species is morphologically similar to *V. rojasii*, differing only in the leaf shape and size. *Vernonia brunneri* has oblong-ovate leaves, 2–7 cm long and 1–3 cm wide, while *V. rojasii* presents lanceolate leaves, which vary between 6–10 cm long and 0.5–2 cm wide.

Additional chromosome studies, especially in *V. brunneri* and other taxa having triporate pollen, could provide a better understanding of the relationships between *V. rojasii* and the remainder American and African species of the tribe Vernonieae.

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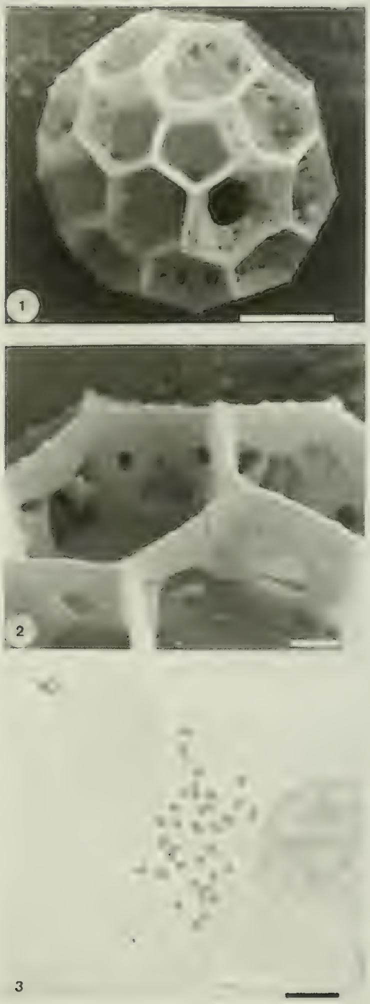

Figs. 1–3. *Vernonia rojasii.*

1-2. Pollen grain.
1. view showing pore. Scale=10µm.
2. details of the muri. Scale=2µm.
3. Somatic chromosomes, 2n=36.
Scale=5µm.

Rediscovery of *Senecio kotschyanus* in Iran

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Abstract

Senecio kotschyanus Boiss. has been recently collected in Iran, where it is endemic and previously only known from the type collection by Kotschy in 1842.

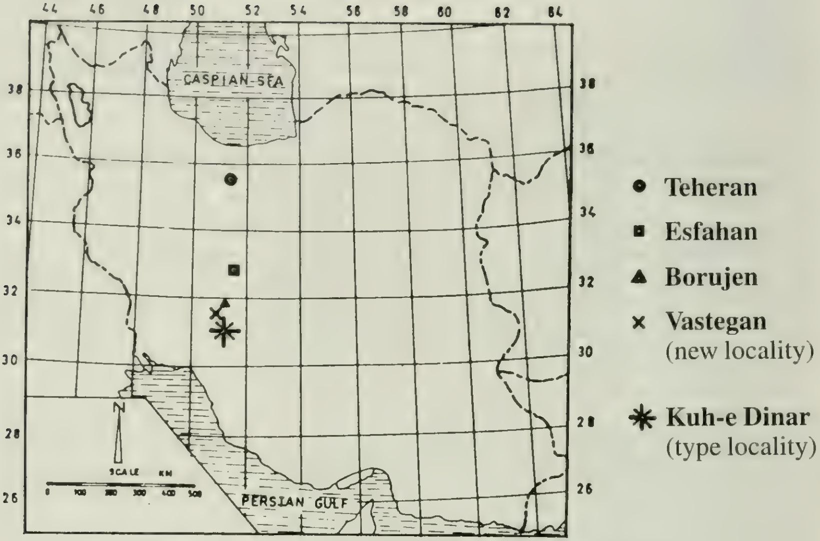
Discussion

Senecio kotschyanus Boiss. was previously only known from the type collection which is Kotschy 771, Persia: S: Fars.: Ad fontem Chashmeh Pias (Dsechme-Pias) in Kuh-e Dinar ("Kuh Daena"), July 1842 (G-BOISS holotype BM, H, P, S, W isotypes).

In spite of the limited material available and most specimens being very young and only few cm in height, this species was considered distinct by Nordenstam in his revision of the Senecioneae for Flora Iranica (Nordenstam 1989). It is now noteworthy that new material of this rare species has been found, 155 years after its first discovery. The new collection is: Moussavi & Tehrani 15585, Chahar, Mahal-e Bakhtiari, Gandoman, Vastegan, Sabz-kuh, 2400–2900 m, 19.VIII.1997 (IRAN, S).

The new locality can be described as the foothill of the Hezar-Darreh mountain (Fig. 1), with is part of the Zagros Range, with a Mediterranean climate and a steppe vegetation of *Artemisia* and *Astragalus*. Geographical location is 31°41'N, 51°05'E. The classical type locality of Kotschy is situated at 31°02'N, 51°30'E, and thus not so far away (Map 1).

The fine new material confirms the status of the species as distinct from its congeners, and as a rare and local endemic taxon. Possibly related species are *S. vulcanicus* Boiss. and *S. iranicus* B. Nord., both growing on the volcano Demavand and also endemic to Iran. From these species *S. kotschyanus* is



Map. 1. Total distribution of *Senecio kotschyanus*.

easily distinguished by the inconspicuous rays, narrowly campanulate involucres and copious white-villous pubescence. Other distinguishing characters are the biennial to perennial habit of *S. vulcanicus* and the completely glabrous achenes of *S. iranicus*, as compared to the obviously annual habit and pubescent achenes of *S. kotschyanus*.

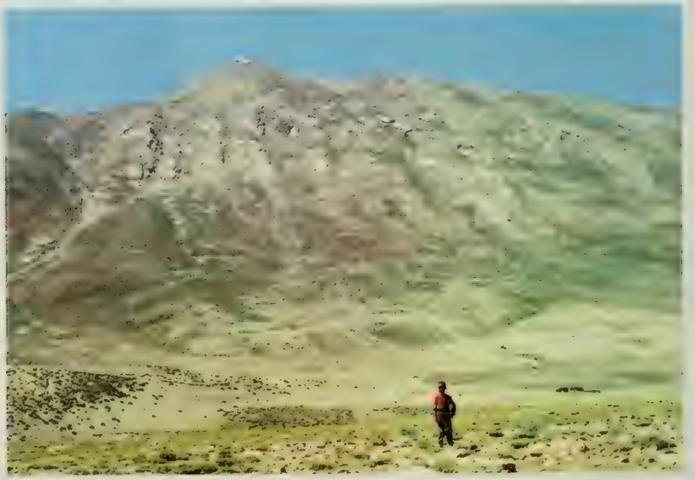


Fig. 1. Foothill of the "Hezar-Darreh", habitat of *Senecio kotschyanus*.
Photo M. Moussavi.

The new collection of this rare plant provides some further information. For example, the height of the plants is up to 13 cm, whereas KOTSCHY's specimens are only 1 to at most 5 cm high. Cf. Figs. 2–4.

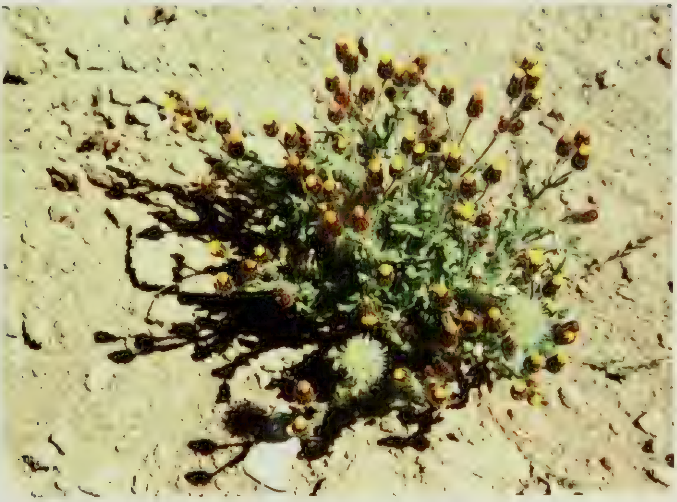


Fig. 2. *Senecio kotschyanus* in the field. Photo M. MOUSSAVI.

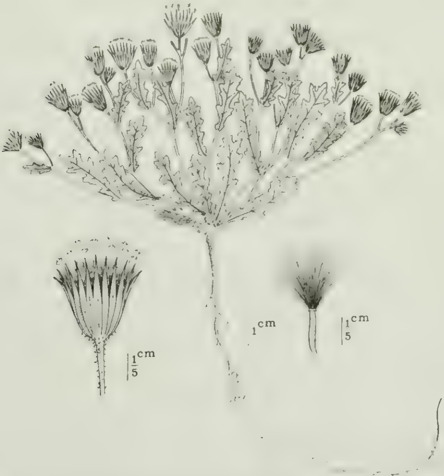


Fig. 3. *Senecio kotschyanus*, drawn from the new collection (MOUSSAVI & TEHRANI 15585, IRAN). The pubescence on involucre and achene is not shown. Del. M. MEHRANFARD.

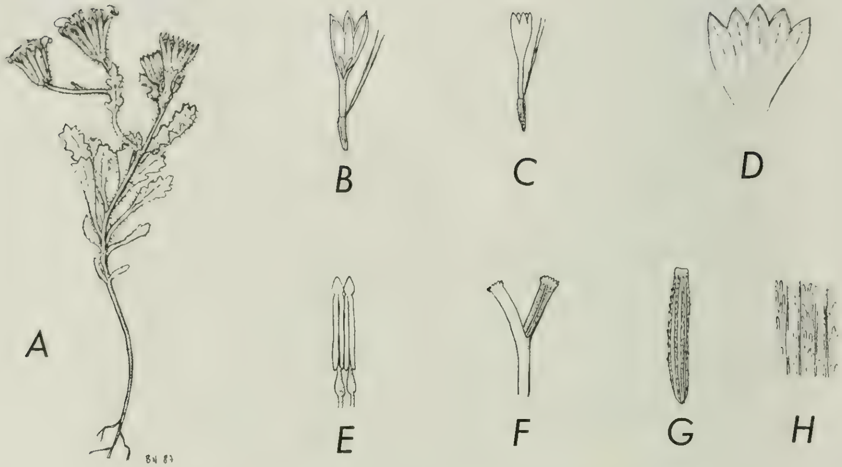


Fig. 4. *Senecio kotschyanus*, drawn from the type collection (Kotschy 771, S isotype).
A Habit, ×1; B Ray-floret, × 2,5; C Disc-floret, × 2,5;
D Corolla of disc-floret laid out, × 5; E Stamens, ×10; F Style-branches of disc-floret, × 10; G Achene, × 5; H Achene surface, detail, × 20.
Del. B. Nordenstam (from Nordenstam 1989).

Acknowledgement

We are grateful to Mr. M. Mehranfard of the IRAN Herbarium for preparing the illustration of Fig. 3.

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Chromosome counts and karyological studies on six taxa of the Egyptian Asteraceae

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Abstract

Chromosome numbers are presented for six taxa of the Egyptian Asteraceae. Karyological studies were carried out on those species. These studies include karyotype features, idiogram drawn and chromosome lengths. A diploid chromosome number of 2n=40 in *Centaurea glomerata* Vahl and 2n=18 in *Anacyclus alexandrinus* Willd. & *Tanacetum santolinoides* (DC.) Feinbrun & Fertig are reported here for the first time, while polyploid number of 2n=72 with x=9 is recorded in *Aster squamatus* (Spreng.) Hieron.

Key words: Egyptian Asteraceae, Chromosome counts, Karyotype analysis.

Introduction

The Asteraceae is one of the four largest families of Angiosperms (1535 genera & 23000 species, Bremer 1994) and is considered by most taxonomists the highest in the scale of evolution. Also in the flora of Egypt, the Asteraceae are well represented (92 genera & 226 species, El-Hadidi & Fayed 1995).

Chromosomes have been considered as sources of valid taxonomic criteria (Moore 1978, Jackson 1984). The karyotype data also appear to be of taxonomic value in providing a logical basis for the redistribution of genera in tribes. Karyotype studies were principally based on the idea that symmetrical karyotypes are more primitive than asymmetrical ones; longer chromosomes more primitive than shorter ones; chromosome arms of equal length (median centromeres) were more primitive than chromosomes with arms of unequal length; low basic numbers had given rise to higher ones. These features are based on the comparison between karyotypes of known relative antiquity, as determined through classical taxonomy (Sharma 1990).

Some studies have dealt with chromosomal features of members of Asteraceae in Egypt. Examples of these include; AMIN (1957) on the genus *Launaea* CASS.; ASHRI (1957); ASHRI & KNOWLES (1960) on genus *Carthamus* L.; NORDENSTAM (1972) on some Compositae from Egypt; AMIN (1973) on some Egyptian plants; AMIN (1978) on the genera *Launaea* CASS. & *Onopordum* L.; KAMEL (1996) on 47 species of the Asteraceae; BADR et al. (1997) on 23 species of subfamily Asteroideae and KAMEL (1999) on 10 species of the Asteraceae.

In the present study, chromosome numbers and detailed karyotype features of six taxa of the Egyptian Asteraceae including four new counts are reported.

Materials and Methods

Materials of the six taxa were collected from various habitats in Egypt. Voucher specimens are deposited at the herbarium of Biological Sciences and Geology Department, Faculty of Education, Ain Shams University, Roxy, Cairo, Egypt. The studied species, the localities from which they were collected and date of collection are given in Table 1.

Cytological preparations were carried out on root tips obtained from seeds germinated on sterile moist filter paper in Petri dishes at 25° C. Roots were pretreated with 0.05% colchicine solution for 2–3 hours, fixed in Carnoy for 24 hours and stored in 70 % ethanol at 4°C. Cytological preparations were made using the Feulgen squash method. The well-spread c-metaphase chromosomes were photographed from temporary preparations at magnifications of 2000 ×. Slides of the original karyotypes are also preserved in the Laboratory of Cytogenetics of the same department.

A karyogram for each taxon was constructed by arranging the chromosomes in homologous pairs by order of their length and arm ratio as measured from the photographic prints. The number of chromosome types was determined as described by LEVAN et al. (1965). Measurements of chromosome length were taken on the same photographs of the karyogram.

The variation in chromosome length (MCL) and chromosome arm ratio (MAR) within the karyotype has been estimated by calculating the standard error (SE) of these parameters. Karyotype asymmetry deduced from the ratio between the short arms of the chromosomes and their total length was expressed as total form percent (TF %) as proposed by HUZIWARA (1962). Karyotype asymmetry expressed by the ratio between chromosome arms has been also estimated as the intrachromosomal asymmetry index (A_1) as suggested by ROMERO ZARCO (1986).

The value of A_1 is considered to be close to zero if all chromosomes are metacentric and near to one if all chromosomes are telocentric. Karyotype asymmetry due to the ratio between size of different chromosomes has been also estimated as the interchromosomal asymmetry index (A_2) using PEARSON's dispersion coefficient, that is the ratio between the standard deviation and the mean chromosome length (ROMERA ZARCO 1986).

The existence of previous chromosome counts for the studied taxa has been verified in the indexes of plant chromosome numbers by FEDOROV (1969), GOLDBLATT (1981, 1984, 1985, 1988) and GOLDBLATT & JOHNSON (1990, 1991, 1994, 1996 & 1998).

Table 1. Taxa studied and their localities. Collected by Dr. E. A. KAMEL; vouchers in herbarium of Biological Sciences & Geology Department, Faculty of Education, Ain Shams Universisty, Cairo, Egypt

No.	Tribe	Taxa	Locality	Date of collection
1	Cardueae	*Centaurea glomerata* VAHL	Rasheed – Alex. Road	5.4.2000
2	Cardueae	*Notobasis syriaca* (L.) CASS.	Alex. Matrouh Road, near Marakia	4.4.2000
3	Gnaphalieae	*Lasiopogon muscoides* (DESF.) DC.	Wadi Al-Arbeen, Santé Catharine, South Sinai	23.2.2000
4	Astereae	*Aster squamatus* (SPRENG.) HIERON.	Cairo – Suez Desert Road (65 km.)	30.3.2000
5	Anthemideae	*Anacyclus alexandrinus* WILLD.	Bourg El-Arab	4.4.2000
6	Anthemideae	*Tanacetum santolinoides* (DC.) FEINBRUN & FERTIG	Wadi Al-Arbeen, Santé Catharine, South Sinai	23.2.2000

Results and Discussions

A summary of the cytological data of the taxa studied is given in Table 8 and their karyotypes & idiograms are illustrated in Figs. 1 & 2.

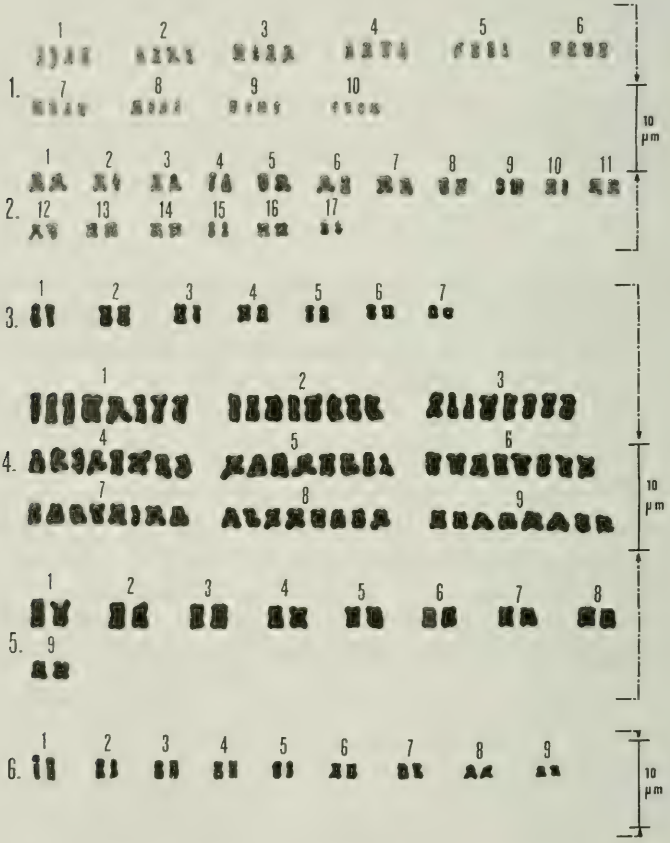

Fig. 1. Karyotypes of the studied taxa

(1) *Centaurea glomerata* Vahl

(2) *Notobasis syriaca* (L.) Cass.

(3) *Lasiopogon muscoides* (Desf.) DC.

(4) *Aster squamatus* (Spreng.) Hieron.

(5) *Anacyclus alexandrinus* Willd.

(6) *Tanacetum santolinoides* (DC.). Feinbrun & Fertig

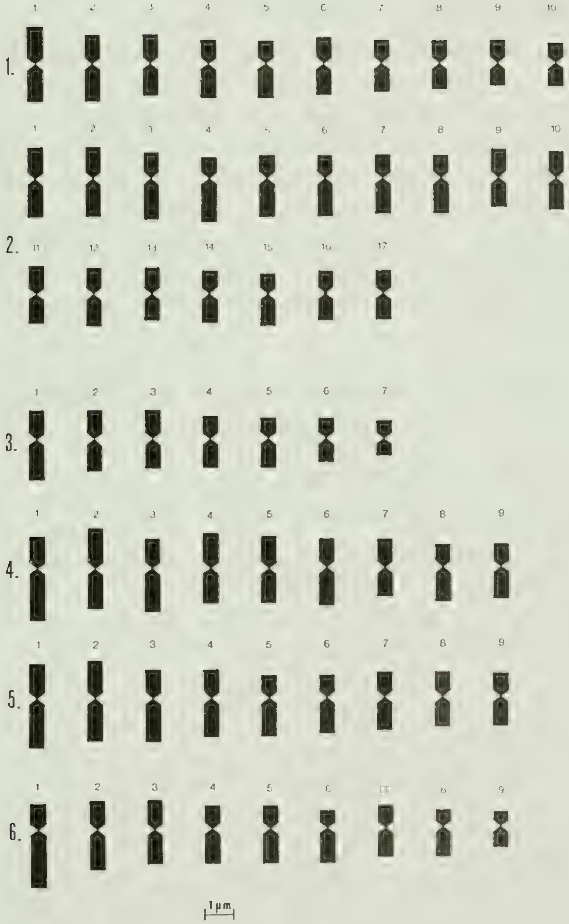

Fig. 2. Idiograms of the studied taxa, constructed with respect to total chromosome length (TCL).

1- *Centaurea glomerata* Vahl

This species is common in the Mediterranean coastal region, in sandy soils. The examined specimen was collected from Rosetta (Rasheed). It was found to be tetraploid with a somatic chromosome number of 2n=40 and basic number of x=10. The chromosome count for this taxaon is recorded here for the first time. The previous counts for other species of the genus *Centaurea* L. in the Egyptian flora were 2n=16 in *C. aegyptiaca* L. (Kamel 1996); 2n=18 in *C. alexandrina* Del. (Kamel 1996) and 2n=20 in *C. alexandrina* Del. & *C. calcitrapa* L. (Goldblatt 1984, 1988, Goldblatt & Johnson 1990 and Kamel 1996). The karyotype is comprised of metacentric chromosomes in four groups. The chromosomes are short (MCL=1.94±0.11µm), the MAR is 1.19±0.05 and TF % is 45.77. The karyotype of this species was found to be the most symmectric one, compared to the other species in this study. The symmetry of the karyotype is also indicated by the values of A_1 (0.15) and A_2 (0.18). Detailed measurements of this species are presented in Table 2.

Table 2. Measurements of somatic chromosomes of *Centaurea glomerata* Vahl

Chr. pair	Chr. length (µm)	Relative length	Short arm (µm)	Long arm (µm)	R. value	Relative R. value	Chromosome type
1	2.60	13.40	1.29	1.31	1.02	8.54	m
2	2.26	11.65	0.99	1.27	1.28	10.72	m
3	2.06	10.62	1.00	1.06	1.06	8.88	m
4	2.04	10.52	0.84	1.20	1.43	11.98	m
5	2.00	10.31	0.82	1.18	1.44	12.06	m
6	1.98	10.21	0.92	1.06	1.15	9.63	m
7	1.75	9.02	0.77	0.98	1.27	10.64	m
8	1.70	8.76	0.82	0.88	1.07	8.96	m
9	1.57	8.09	0.77	0.80	1.04	8.71	m
10	1.44	7.42	0.66	0.78	1.18	9.88	m
Total	**19.40**	**100.00**	**8.88**	**10.52**	**11.94**	**100.00**	–
Mean ± SE	**1.94 ± 0.11**	–	**0.89 ± 0.06**	**1.05 ± 0.06**	**1.19 ± 0.05**	–	–

2- *Notobasis syriaca* (L.) Cass. (= *Carduus syriacus* L. , *Cirsium syriacum* (L.) Gaertner)

This species is rare and found in roadsides, waste places or stony hillsides in the Mediterranean coastal region. The present specimen in this study was collected from Alexandria – Marsa Matrouh coastal road, near Marakia. This species has a somatic chromosome number of 2n=34 in 17 homologous pairs. This basic number was previously reported in Goldblatt (1984) and Goldblatt & Johnson (1991). The karyotype consists of 16 m och 1 sm chromosome pairs. The MCL is 2.01±0.06 μm, the MAR is 1.35±0.07, the TF % is 42.94, the A_1 is 0.23 and A_2 is 0.12. The detailed measurements of this species are found in Table 3.

Table 3. Measurements of somatic chromosomes of *Notobasis syriaca* (L.) Cass.

Chr. pair	Chr. length (mm)	Relative length	Short arm (μm)	Long arm (μm)	R. value	Realtive R. value	Chromosome type
1	2.40	7.02	1.10	1.30	1.18	5.15	m
2	2.38	6.96	1.06	1.32	1.25	5.46	m
3	2.30	6.72	0.86	1.44	1.67	7.29	m
4	2.28	6.66	0.74	1.54	2.08	9.08	sm
5	2.14	6.26	0.82	1.32	1.61	7.03	m
6	2.14	6.26	0.84	1.30	1.55	6.77	m
7	2.04	5.96	0.84	1.20	1.43	6.24	m
8	2.00	5.85	0.84	1.16	1.38	6.03	m
9	2.00	5.85	0.98	1.02	1.04	4.54	m
10	1.96	5.73	0.88	1.08	1.23	5.37	m
11	1.94	5.67	0.96	0.98	1.02	4.45	m
12	1.93	5.64	0.87	1.06	1.22	5.33	m
13	1.80	5.26	0.88	0.92	1.05	4.59	m
14	1.78	5.20	0.78	1.00	1.28	5.59	m
15	1.78	5.20	0.68	1.10	1.62	7.07	m
16	1.70	4.97	0.80	0.90	1.13	4.93	m
17	1.64	4.79	0.76	0.88	1.16	5.07	m
Total	**34.21**	**100.00**	**14.69**	**19.52**	**22.90**	**99.99**	–
Mean ± **SE**	**2.01** ± **0.06**	–	**0.86** ± **0.03**	**1.15** ± **0.05**	**1.35** ± **0.07**	–	

3- *Lasiopogon muscoides* (Desf.) DC.

This species is also rare in the flora of Egypt and found in gravelly soils. The material of this species was collected from Wadi Al-Arbeen, Santé-Catharine in South Sinai. A somatic chromosome number of 2n=14 in only seven pairs was recorded in this species. The karyotype is comprised of metacentric chromosomes only. The MCL is 1.80±0.14 μm, the MAR is 1.22±0.07, the TF % 45.04, A_1 is 0.17 and A_2 is 0.21. This species has the shortest chromosomes in the present study. Detailed chromosome measurements are presented in Table 4.

Table 4. Measurements of somatic chromosomes of *Lasiopogon muscoides* (Desf.) DC.

Chr. pair	Chr. length (μm)	Relative length	Short arm (μm)	Long arm (μm)	R. value	Relative R. value	Chromo-some type
1	2.37	18.82	0.97	1.40	1.44	16.86	m
2	2.10	16.68	0.98	1.12	1.14	13.35	m
3	1.97	15.65	0.97	1.00	1.03	12.06	m
4	1.73	13.74	0.76	0.97	1.28	14.99	m
5	1.67	13.26	0.67	1.00	1.49	17.45	m
6	1.52	12.07	0.72	0.80	1.11	13.00	m
7	1.23	9.77	0.60	0.63	1.05	12.30	m
Total	**12.59**	**99.99**	**5.67**	**6.92**	**8.54**	**100.01**	–
Mean ± SE	**1.80 ± 0.14**	–	**0.81 ± 0.06**	**0.99 ± 0.09**	**1.22 ± 0.07**	–	–

4- *Aster squamatus* (Spreng.) Hieron. (= *Conyza squamata* Spreng.)

This species is introduced and naturalized in moist places. The specimen is collected from Cairo – Suez desert road (65 km). This species was found to be octoploid with somatic chromosome number of 2n=72 and a basic chromosome number of x=9. The previous chromosome counts for this species was 2n=20 with x=10 (Fedorov 1969, Goldblatt 1981, 1984, 1985, Goldblatt & Johnson 1991 and Kamel 1996). The karyotype of this species consists of 1 pair of metacentric chromosomes with median point and 8 pairs of metacentric chromosomes with median region. This species was found to have the longest chromosomes in the present study. The MCL is 2.34±0.12 µm. The karyotype symmetry measures i.e. MAR (1.29+0.07), the TF % (44.11), A_1 (0.20) and A_2 (0.15) indicate also a high degree of symmetry in the karyotype of this species. Measurements of chromosomes are found in Table 5.

Table 5. Measurements of somatic chromosomes of *Aster squamatus* (Spreng.) Hieron.

Chr. pair	Chr. length (µm)	Relative length	Short arm (µm)	Long arm (µm)	R. value	Relative R. value	Chromosome type
1	2.91	13.83	1.13	1.78	1.58	13.61	m
2	2.72	12.93	1.35	1.37	1.01	8.70	m
3	2.52	11.98	1.03	1.49	1.45	12.49	m
4	2.44	11.60	1.22	1.22	1.00	8.61	m
5	2.34	11.12	1.11	1.23	1.11	9.56	m
6	2.22	10.55	0.95	1.27	1.34	11.54	m
7	2.05	9.74	0.93	1.12	1.20	10.34	m
8	2.02	9.60	0.81	1.21	1.49	12.83	m
9	1.82	8.65	0.75	1.07	1.43	12.32	m
Total	**21.04**	**100.00**	**9.28**	**11.76**	**11.61**	**100.00**	–
Mean ± SE	**0.12**	–	**1.03 ± 0.06**	**0.07**	**0.07**	–	–

5 - *Anacyclus alexandrinus* Willd.

This species is common in sandy places and calcareous rock habitats. The present material was collected from Burg El-Arab. A somatic chromosome number of 2n=18 in 9 homologous pairs of metacentric chromosomes with median region (9m) were recorded in this species for the first time. The calculated MCL is 2.24±0.12 µm and MAR is 1.32±0.05. The TF % is 43.35, the A_1 is 0.23 and A_2 is 0.16. Chromosome measurements are found in Table 6.

Table 6. Measurements of somatic chromosomes of *Anacyclus alexandrinus* Willd.

Chr. pair	Chr. length (µm)	Relative length	Short arm (µm)	Long arm (µm)	R. value	Relative R. value	Chromosome type
1	2.87	14.25	1.20	1.67	1.39	11.74	m
2	2.70	13.41	1.25	1.45	1.16	9.80	m
3	2.47	12.26	1.02	1.45	1.42	11.99	m
4	2.27	11.27	0.95	1.32	1.39	11.74	m
5	2.07	10.28	0.82	1.25	1.52	12.84	m
6	2.03	10.08	0.83	1.20	1.45	12.25	m
7	1.97	9.78	0.90	1.07	1.19	10.05	m
8	1.93	9.58	0.93	1.00	1.08	9.12	m
9	1.83	9.09	0.83	1.03	1.24	10.47	m
Total	**20.04**	**100.00**	**8.73**	**11.44**	**11.84**	**100.00**	–
Mean ± SE	**2.24 ± 0.12**	–	**0.97 ± 0.05**	**1.27 ± 0.07**	**1.32 ± 0.05**	–	–

6- *Tanacetum santolinoides* (DC.) Feinbrun & Fertig (= *Pyrethrum santolinoides* DC.)

This species is rare in the mountains and rocky habitats in Sinai. The examined material in the present study was collected from Wadi Al-Arbeen, Santé-Catharine in South Sinai. This species was found to be diploid with a somatic chromosome number of 2n=18 and a basic chromosome number of x=9. This chromosome count is also reported here for the first time. The karyotype of this species consists of 6 pairs of metacentric chromosomes (6 m) and 3 pairs of submetacentric chromosomes (3 sm). The MCL is 1.98±0.16 µm. The karyotype asymmetry measures i.e. MAR (1.64±0.13), the TF % (38.31), A_1 (0.36) and A_2 (0.24) indicate a high degree of asymmetry in the karyotype of this species. Measurements of chromosomes are found in Table 7.

Table 7. Measurements of somatic chromosomes of *Tanacetum santolinoides* (DC.) FEINBRUN & FERTIG

Chr. pair	Chr. length (µm)	Relative length	Short arm (µm)	Long arm (µm)	R. value	Relative R. value	Chromosome type
1	2.86	16.04	0.86	2.00	2.33	15.82	sm
2	2.40	13.46	1.04	1.36	1.31	8.89	m
3	2.20	12.34	0.96	1.24	1.29	8.76	m
4	2.02	11.33	0.78	1.24	1.59	10.79	m
5	2.00	11.22	0.80	1.20	1.50	10.18	m
6	1.76	9.87	0.56	1.20	2.14	14.53	sm
7	1.75	9.81	0.75	1.00	1.33	9.03	m
8	1.60	8.97	0.56	1.04	1.86	12.63	sm
9	1.24	6.95	0.52	0.72	1.38	9.37	m
Total	**17.83**	**99.99**	**6.83**	**11.00**	**14.73**	**100.00**	–
Mean ± SE	**1.98 ± 0.16**	–	**0.76 ± 0.06**	**1.22 ± 0.12**	**1.64 ± 0.13**	–	–

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Table 8. Summary of the cytological features of the studied taxa

No.	Taxa	Previous chromosome counts	2n	(x)	MCL (µm) ± SE	MAR±SE	TF %	A_1	A_2	Karyotype formula
1	*Centaurea glomerata* VAHL	–	40	10	1.95±0.11	1.19±0.05	45.77	0.15	0.18	(10 m)
2	*Notobasis syriaca* (L.) CASS.	34	34	17	2.01±0.06	1.35±0.07	42.94	0.23	0.12	(16 m + 1sm)
3	*Lasiopogon muscoides* (DESF.) DC.	14	14	7	1.80±0.14	1.22±0.07	45.04	0.17	0.21	(7 m)
4	*Aster squamatus* (SPRENG.) HIERON.	20	72	9	2.34±0.12	1.29±0.07	44.11	0.20	0.15	(1 M + 8 m)
5	*Anacyclus alexandrinus* WILLD.	–	18	9	2.24±0.12	1.32±0.05	43.35	0.23	0.16	(9 m)
6	*Tanacetum santolinoides* (DC.) FEINBRUN & FERTIG	–	18	9	1.98±0.16	1.64±0.13	38.31	0.36	0.24	(6 m + 3sm)

MCL = Mean chromosome length
SE = Standard error
MAR = Mean arm ratio

TF % = Total form
A_1 = Intrachromosomal asymmetry index
A_2 = Interchromosomal asymmetry index

M = Metacentric point chromosome
m = Metacentric region chromosome
sm = Submetacentric chromosome

News and Notes

DeepAchene: The CompositaeAlliance

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Recently some systematists working in the Compositae got together and organized an informal group to try and coordinate everyone who is doing phylogenetic work in the family. After much discussion we decided to call it **DeepAchene: The CompositaeAlliance.**

The idea is to have a website with a table that lists who is doing what and with which groups. We had a small meeting at the Botany 2000 meeting in Oregon, USA, in August of 2000. Our next meeting is in August of this year at the Botany 2001.

If you are attending the meeting and giving a paper, please make sure you use the family name in the title. We will all be grouped into a half day or a full day of contributed papers. At the end of the day we will have a meeting of The Alliance. We hope to organize so that periodically, say once a year, we can put our published data together for a "big picture" analysis for the family.

The nice thing about such a plan is that everyone maintains control of his/her own research data and the overall analysis becomes sort of a "virtual research program". Let me stress that this does not preclude anyone from working in any part of the family. Claims are not being staked for tribes, genera, etc. We are simply trying to coordinate an effort for those who are interested in participating. Dr. Nordenstam has graciously agreed to let us submit articles and notices to the Compositae Newsletter for publication. If you would like to be on the email-list, please let me know (funk.vicki@nmnh.si.edu).

For information on the Botany 2001 meeting go to the ASPT website at www.sysbot.org.

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